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TRANSCRIPT OF RECORD

Supreme Court of the United States

OCTOBER TERM, 1938

No. 76

THE MAYTAG COMPANY, PETITIONER,

vs.

HURLEY MACHINE COMPANY AND ELECTRIC HOUSEHOLD UTILITIES CORPORATION

No. 77

THE MAYTAG COMPANY, PETITIONER,

vs.

EASY WASHING MACHINE CORPORATION

ON WRITS OF CERTIORARI TO THE UNITED STATES CIRCUIT COURT OF APPEALS FOR THE SECOND CIRCUIT

PETITION FOR CERTIORARI FILED JUNE 1, 1938.

CERTIORARI GRANTED FEBRUARY 6, 1939.

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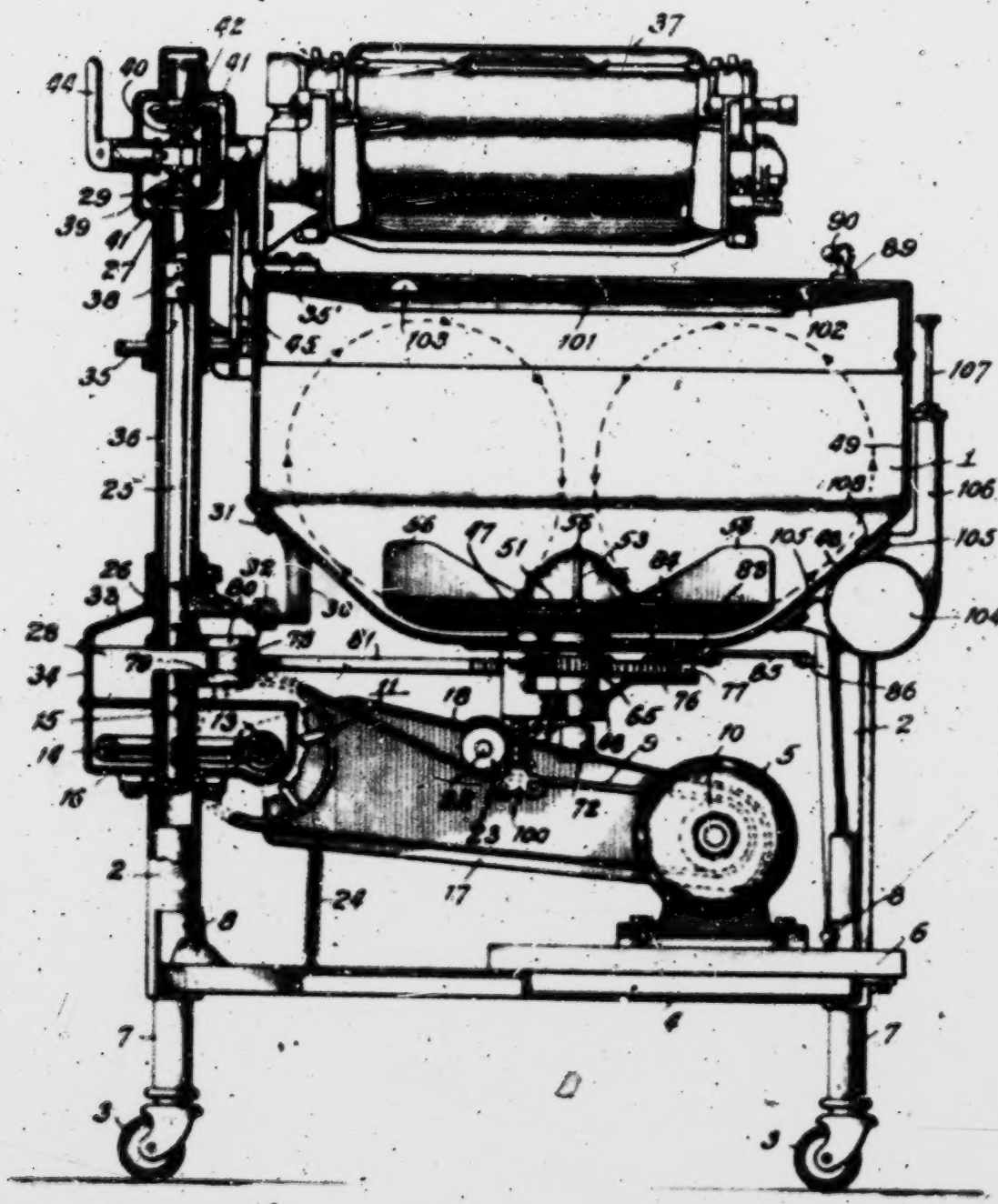
1857.

July 12, 1932. H. F. SNYDER 1,866,779

WASHING MACHINE

Filed June 14, 1922 3 Sheets-Sheet 1

Fig. 1.



Inventor:
Howard F. Snyder,
by Wallace R. Lane
Atty.

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July 12, 1932. H. F. SNYDER 1,866,779

WASHING MACHINE

Filed June 14, 1922 3 Sheets-Sheet 2.

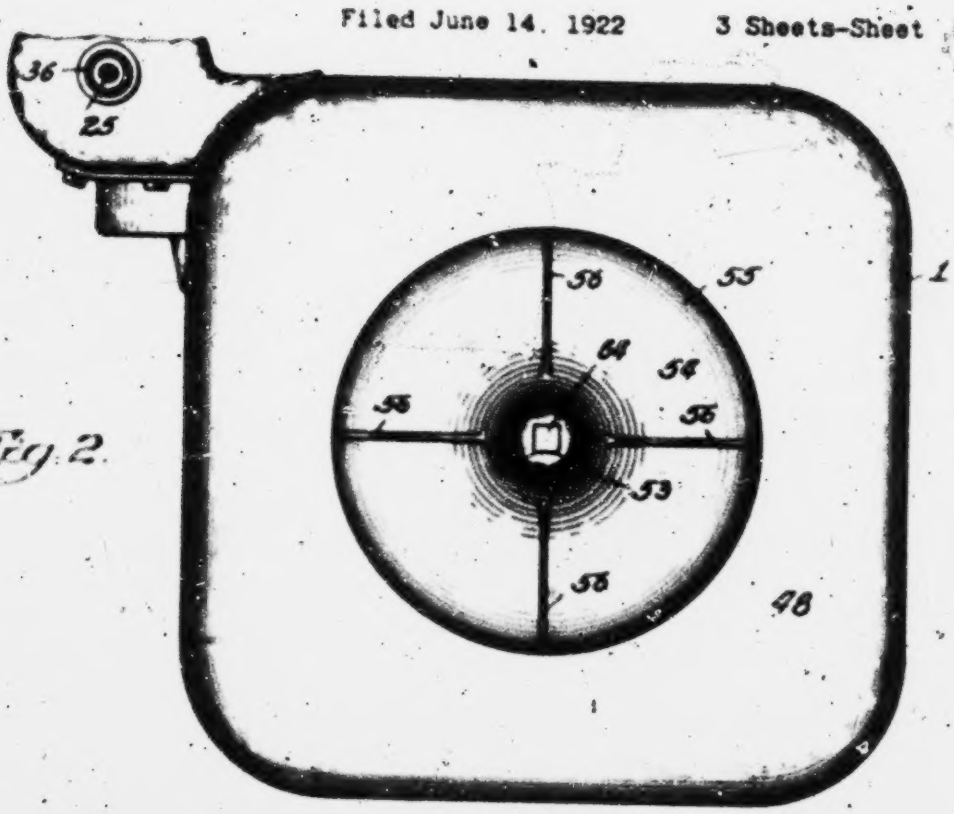

Fig. 2.

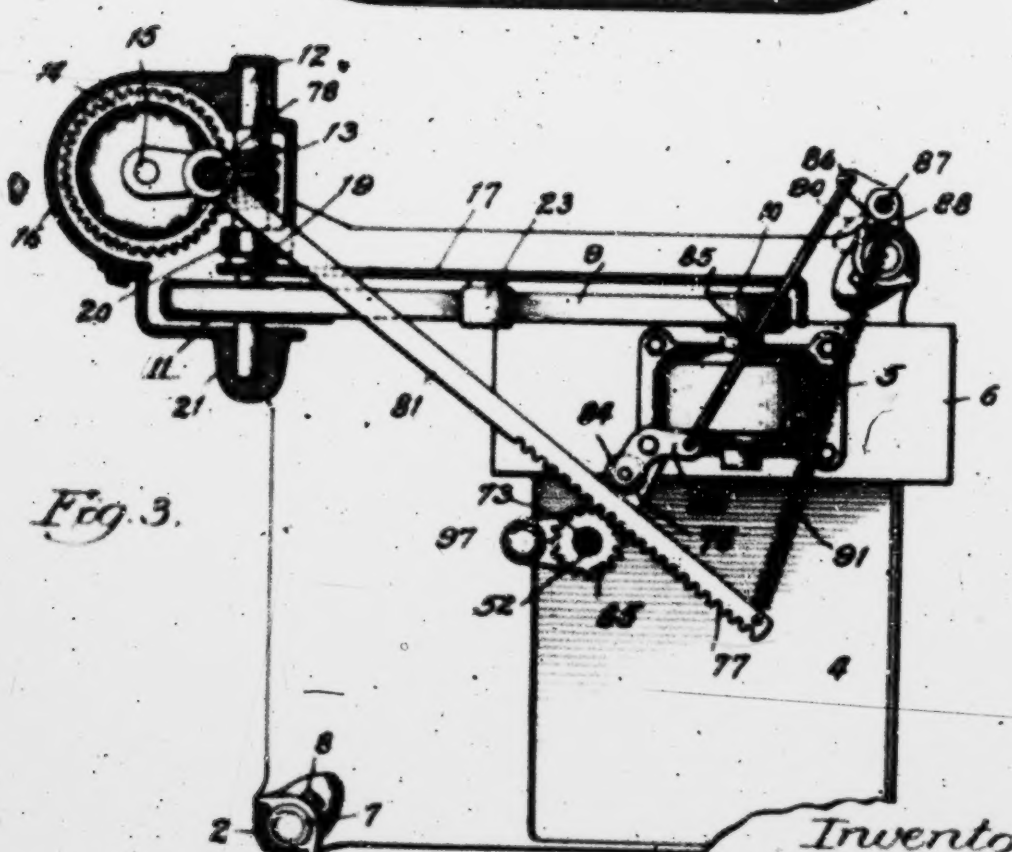

Fig. 3.

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July 12, 1932. H. F. SNYDER 1,866,779

WASHING MACHINE

Filed June 14 1927 3 Sheets-Sheet 3

Fig. 4.

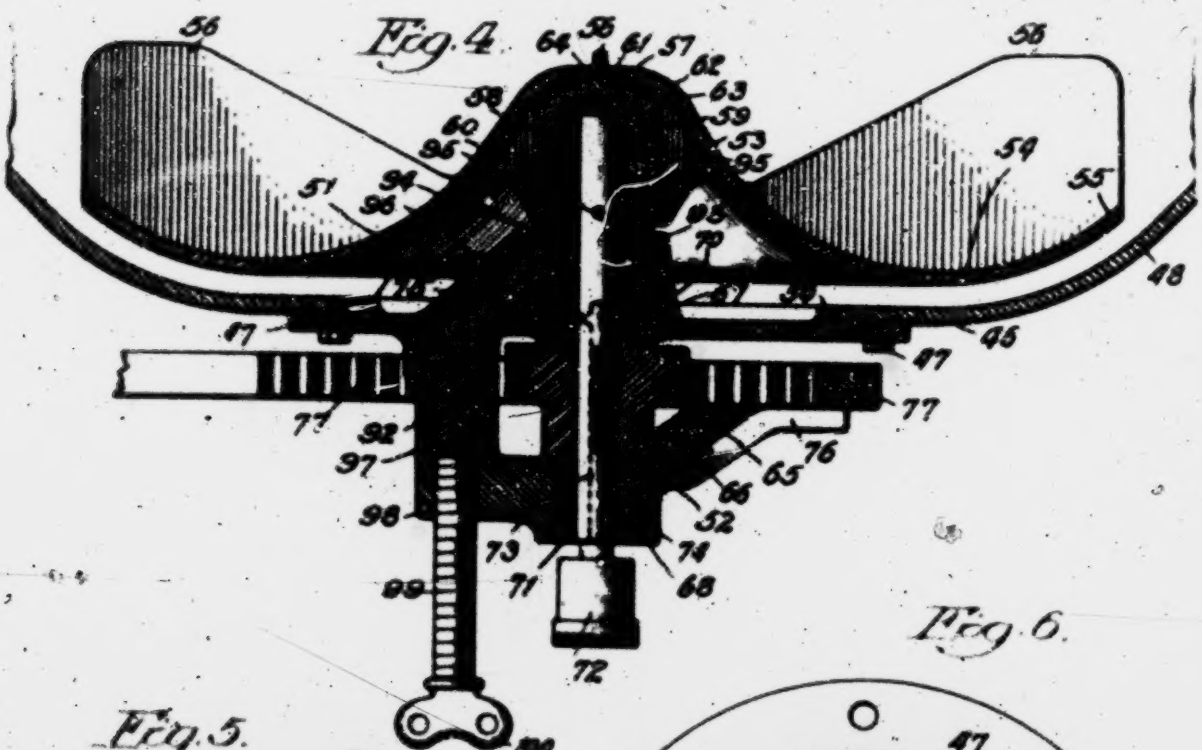


Fig. 6.

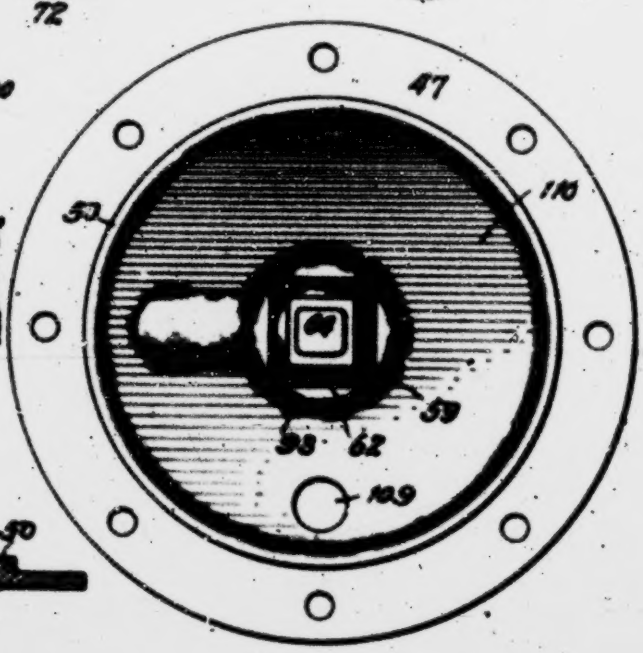
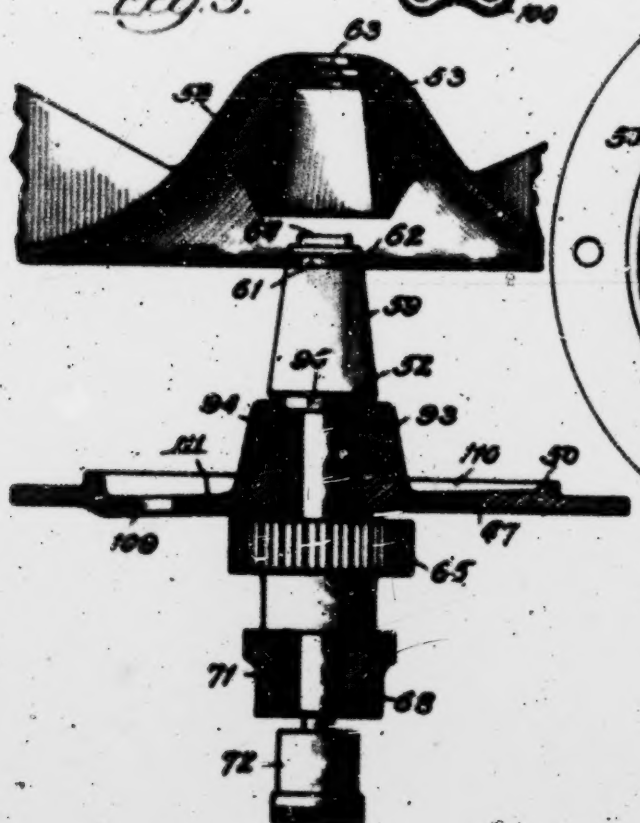


Fig. 5.



Inventor:
Howard F. Snyder,
by Wallace R. Lane,
Atty.

DISCLAIMER

1,866,779.—*Howard F. Snyder*, Newton, Iowa. WASHING MACHINE. Patent dated July 12, 1932. Disclaimer filed February 23, 1937, by the assignee, *The Maytag Company*.

Hereby enters its disclaimer of claims 1 and 38 of said Letters Patent.

[*Official Gazette April 6, 1937.*]

Patented July 12, 1932

1,866,779

UNITED STATES PATENT OFFICE

HOWARD F. SNYDER, OF NEWTON, IOWA, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE MAYTAG COMPANY, OF NEWTON, IOWA, A CORPORATION OF DELAWARE

WASHING MACHINE

Application filed June 14, 1928. Serial No. 285,158.

The present invention relates to a power driven washing machine and more particularly to the construction of the gyrator or impeller and tub thereof and the gyrator or impeller operating mechanism for such machine.

Among the objects of the invention is to provide a novel construction designed to wash and thoroughly cleanse clothes, fabrics and various similar materials of all kinds. My invention is equally efficient in washing fabrics, and other similar materials of a very delicate nature, that may have become frail and weak owing to aging, wear and otherwise. Among such delicate materials are included fine laces, nettings, veils, fine silks, lace curtains and various other articles. Very often valuable articles, relics, heirlooms and other objects of great value are composed partly or wholly of fine and frail textures, such that they cannot be easily washed when soiled, since their nature would not permit subjecting them to the rigors of the ordinary washing machine operation, or even washing by hand. By my invention, the washing and cleansing of such objects is not only made possible, but practicable, such that most delicate and frail objects can be handled mechanically during the washing operation without marring their character and beauty. By reducing friction on the articles to be washed the life of the article is preserved.

These and the other objects of the invention are attained by so constructing and associating the tub and the gyrator of the washing machine, and so operating the gyrator that the weight of the articles does not interfere with the gyrator, or its action, or with the tub and its co-action with the gyrator. In my invention the gyrator and tub, irrespective of the upper or lower end position of the gyrator therein, so coact that the goods to be cleansed are not only given a definite washing and cleansing movement, but are also maintained, during such movement, in a suspended condition in the liquid, so that the rapid and energetic alternating rotary movements of the gyrator do not interfere with the goods or cause them any injury or damage, while at the same time the goods and the wash water, (or the rinse water, when rinsing), are turbulently swirled or whirled about with a surging and seething movement within the tub. Even in the form of the invention illustrated, wherein the liquid impelling blades are disposed at the bottom of the tub, the action of the agitator on the liquid is to constantly press the clothes upwardly in a swirling formation so that they are maintained in substantial suspension in the liquid above the blades. To this end the tub preferably has a smooth interior not interrupted by flanges or other projections, and preferably has an inclined bottom portion so associated with the gyrator and the remainder of the tub as to cooperate therewith in aid of such action.

One of the principal objects of this invention resides in providing this improved method of and apparatus for cleansing fabrics without bringing them into substantial rubbing contact with the walls of the tub or the liquid agitating mechanism.

As another object of the invention, the gyrator is provided with flanges which, during the alternations thereof, act to successively impart movement to the contents of the tub, such that the resultant direction of movement of the contents in the embodiment illustrated in the drawings is normally radially outward from the central portion of the tub, then upwardly, then inwardly and then downwardly toward the center of the gyrator, and yet at the same time there is a generally rotary progression or movement about the inside of the tub, first in one direction and then in an opposite direction, such movement being in the nature of a gyratory action or movement and appearing to be that of a helix around a ring. In this way the goods or objects undergoing the washing operation are driven about in the tub in devious paths, while at the same time the wash water or cleansing fluid is being vigorously agitated and rigorously moved about the tub in devious paths to sustain the washable materials, whereby they will not be injuriously affected by the gyrator operating or actuating mechanism. This mechanism may be

readily thrown into and out of operative connection with the gyrator at will.

Still further objects of this invention reside in providing a novel construction of agitator blade; and in further providing resilient means, tending to normally render the gyrator inoperative but yieldable to render the same operative when manually actuated; to provide a combined means for guarding against the accidental contact or interference of the operator with the driving mechanism of the washing machine and maintaining the driving mechanism in effective driving condition, as by constantly maintaining a driving belt taut; and to provide other features having the objects, advantages and capabilities hereafter more fully appearing.

Due to the construction and arrangement of the tub, gyrator and driving mechanism, this machine provides a decidedly new method of cleaning fabrics, in that while the clothes are washed thoroughly, this is done by the action of the water itself on the materials as distinguished from their being rubbed or drawn through the water by a dolly or other mechanism, or tumbled against the sides of the tub or rubbed against projections on the interior of the tub. In my machine the clothes are driven and swirled about in and by the water in the interior of the smooth tub. The materials never come in any substantial contact with either the tub, or the gyrator which initially causes the agitation, seething and surging of the water on the interior of the tub. The peculiar movement of the water caused by the action of my gyrator in operation largely prevents rubbing the clothes against the container or gyrator and eliminates the deterioration of the materials being washed by it. These and other advantages which I find it difficult to explain because of the unusual movement of the water are possessed by my machine.

By the term gyrator is meant an alternating rotary member operable to effect movements of fluids and materials from the central portion of the member toward its outer edge or borders.

In the drawings illustrating a preferred form of the invention:—

Fig. 1 is a vertical sectional view taken through the washing machine.

Fig. 2 is a horizontal sectional view taken through the tub, showing the gyrator in top plan view.

Fig. 3 is a sectional view showing portions of the operating mechanism.

Fig. 4 is a detail vertical sectional view on an enlarged scale of the bottom of the tub, the gyrator, part of the gyrator operating mechanism and the packing means for the bearing of the gyrator shaft.

Fig. 5 is a detailed sectional view of the driving connection between the gyrator and the driving mechanism therefor.

Fig. 6 is a top plan view of the removable plate at the bottom of the tub, with the gyrator removed.

Referring more particularly to the drawings the washing machine comprises a tub 1 supported upon and fastened to legs 2 having roller casters 3. To the legs 2 is secured a platform 4 upon which is supported a motor 5 bolted to an insulating base piece 6 in turn bolted to the platform 4. The legs 2 have telescopic sections 7 of tubular form slidable in clamp portions, forming part of the legs 2, for the purpose of adjusting the height of the washing machine, the sections 7 being held in adjusted position by means of set screws 8. The motor 5 is connected to the driving mechanism by means of a belt 9 running over a pulley 10 fixed to the motor shaft and a driven pulley 11 fastened to a cross shaft 12 carrying a worm screw 13 in mesh with a worm gear 14 keyed to a vertical shaft 15. The gear mechanism 13–14 is suitably housed in a housing 16 bolted to and forming part of one of the supporting legs of the washing machine.

Between the motor 5 and the gear mechanism 13–14 extends an aluminum belt guard 17 which encases the belt 9 and pulleys 10 and 11, the guard having a flange 18 extending over the upper lap of the belt and the pulley 10. By this means accidental contact with the driving belt 9 and pulleys 10 and 11 is prevented. The guard has a hub portion 19 by which it is pivotally supported upon a part of the shaft 12 between the bearings 20 and 21 formed in the housing 16. To an intermediate part of the guard is fastened a pivot stud 22 upon which is idly and rotatably carried a belt tightener roller 23. It will be noted that this guard is supported only by the shaft 12 and the roller 23 bearing upon the upper lap of the belt 9, so that the guard is capable of an upward and downward swinging movement about the axis of the shaft 12 as the belt becomes taut or slack. The amount of the tautness given the belt, as the roller 23 presses against it, is derived from the combined weight of the guard, with the parts carried by it, and a tension spring 24 connected between and to the guard 17 and the platform 4, the tension of the spring adding to the weight of the guard to maintain the roller 23 in tightening contact with the belt.

In vertical alinement with the shaft 15 is a second shaft 25, rotatably supported in suitable bearings 26 and 27 respectively, forming parts of the crank and gear housings 28 and 29. Said housing 28 is rigidly connected to the tub by means of a bracket 30 and bolts 31 and 32 and includes the top and intermediate members 33 and 34 of the housing 16. The housing 29 is rotatably sup-

ported upon a ledge 35 rigidly bolted to the side of the tub 1 and also made fast to the top of the tub through a bolted bracket 35'. A tube 36 is connected between the members 33 and 29 and houses the shaft 25. The shaft 25 drives a wringer 37 through the medium of clutches 38, 39 and 40, and gears 41, 42 and 43, which may be manually and selectively controlled through the handle 44 for causing the operating of the wringer in any direction desired and in whatever position the wringer may be relative to the tub. The wringer is capable of swinging into different positions with respect to the tub about the axis of the shaft 25, and to be held in any of its positions by a spring pressed locking pin 45 cooperative with recesses in the ledge 35. The details of the mechanism for operating the wringer do not form part of this invention, and therefore, further description thereof is deemed unnecessary.

The tub 1 is preferably substantially square in horizontal cross-section and is shallow with respect to its horizontal dimensions. It has a central bottom portion 46, an inclined portion 48 and vertical side walls 49. It may, however, be of other form than square and the inclined portion 48 may be omitted.

For the purposes of exemplifying my invention, the gyrator or impeller is disclosed and described as mounted on the tub for support. Herein it is shown as projecting upwardly through the bottom of the tub, but it must be evident that all desirable arrangements are within the contemplation of this invention, such, for instance, as the mounting of the impeller so as to depend into the liquid from the upper portion of the tub, thereby bringing about the consequent reversal in the flow of the fluid through the tub. Thus, as modified, the flow will be radially outwardly and thence downwardly, and then inwardly and upwardly toward the center of the gyrator. In the present disclosure the bottom 46 of the tub 1 has a circular opening which is normally closed by a plate 47 bolted to the bottom 46. The radially extending portion 48 at the bottom 46 inclines upwardly toward the vertical side of walls 49 of the tub for a purpose hereafter described. The plate 47 supports the gyrator 51, the packing means for the gyrator shaft 52 and part of the operating mechanism for the gyrator.

The gyrator is metal, or other suitable material, and is of generally circular form when viewed in plan. It comprises an annular, trough-like or dish-shaped portion 54, the central or inner portion of which merges in a continuous concave curve into a central upstanding stem portion 53 which tapers upwardly and terminates in an upper rounded end. The outer peripheral edge of the trough-like portion 54 extends outwardly and upwardly in a concave curve 55 which is continuous with the dished curve of the portion 54. The gyrator is provided with liquid impelling means, one form and arrangement of which is illustrated in the drawings.

Extending in spaced position radially from the central stem or dome 53 are a plurality of flat, vertically projecting blades, wings or flanges 56 of the shape shown in Fig. 4 of the drawings. The projecting surfaces of these blades taper or incline inwardly in a general direction from their outer edges to the trough-like portion of the gyrator. They extend from the outer edge of the upwardly inclined portion 55, across the portion 54, thereof, and thence upwardly vertically along the sides of the central upstanding stem 53 to a point approximately half way up the sides thereof. At this point the blades merge into the upper rounded end of the stem. The remaining or upper part of the stem is free of blades and forms a smooth, continuously flowing curve at the apex 57.

These blades 56 are of substantial height at their outer portions, so as to project well into the cleaning fluid. The blades incline or curve downwardly and inwardly toward the central axis of the agitator, that is, to the sides of the stem where they merge into the stem. As shown in Fig. 4, the blades extend across the dish-shaped member at the lower ends in lobe-shaped form and the upper surfaces of the wings or blades extend considerably above the dish-shaped member to provide sufficient blade surface to impart a considerable force or throw to the water in the direction outwardly and somewhat parallel to the axis of rotation of the gyrator, as hereinbefore described. It is to be noted that the outer inclined portion 55 of the dish-shaped member assists in this movement and that this directional flow is augmented by the inclined walls 48 of the surrounding trough or tub. The force imparted to the water is sufficient to cause the water to flow upwardly toward the top of the tub, as shown in dotted lines, Fig. 1. The downward flow at the upper central portion of the tub prevents the overflow of suds. In the embodiment shown there are four of these blades, but any other number may be used as desired. Within the central stem portion 53 and depending from the apex 57 thereof is a hollow pyramidal socket 58, preferably square in horizontal section. It is adapted to fit upon a square pyramidal block or step 59 socketed to fit upon the upper end of the shaft 52 and secured to said shaft, to positively rotate [illegible]with, by a cross pin 60 extending transversely through the shaft. At the upper end portion of the step 59 is formed an annular groove 61 in which reposes a spring lock ring 62 adapted, when the gyrator is forceably moved downwardly upon the step 59, to expand into an annular groove 63 formed in the apex portion 57 of

the gyrator. The uppermost end 64 of the step is squared to fit into a like aperture formed into the apex 57. The lower end of the socket may be provided with notches into which the ends of the cross pin 60 may extend, if desired. The various gyrator portions, namely, the apex, trough, peripheral, blade and pyramidal portions all are preferably integral. While this embodiment illustrates the invention, it is to be understood that the gyrator may be located at the top of the tub and in depending position from the top or cover thereof.

The shaft 52 is fixed to a pinion 65 by means of a key 66, and has bearings 67 and 68 respectively formed in the plate 47 and in a bracket 69 bolted to the underside of the plate 47. These bearings have bushings 70 and 71, preferably of brass or bronze. The pinion 65 is in thrust bearing with the ends of the bearings 67 and 68, and clamping bolts hold the bracket 69 in place such that the pinion 65 has no loose play, yet it is permitted to freely rotate or oscillate. The lower end of the shaft 52 has a grease cup 72 operative to supply a lubricant through bores 73, 74 and 75 to the bearing surface between the shaft 52 and bushings 70 and 71. The bracket has an arm 76 upon which rests and freely slides reciprocating rack 77 adapted to mesh with the drive pinion 65, the other end or crank arm portion 81 of the rack being pivotally connected to a crank pin 78 fixed to crank arms 79 and 80 fastened to the ends of the shafts 15 and 25.

The rack 77 may be thrown into or out of operative engagement or mesh with the pinion 65 at will. This is accomplished by the mechanism shown in Fig. 3. Upon the end of the arm 76 is pivotally supported a bell crank lever 83 carrying at one of its ends a roller 84 bearing against the rear face of the rack 77 and being apertured at its other end to receive a bent end of a link 85 running to a crank arm 86 having its free end also apertured to receive the other bent end of the link, the link being thus pivotally connected to said lever 83 and arm 86. The arm is fast to a vertical shaft 87 rotatably supported in bearings 88 and 89 respectively rigidly secured to a leg 2 and the side of the tub 1 (see Figs. 3 and 1). To the upper end of the shaft is fastened a handle 90 by which the lever 83, through the media of link 85, arm 86 and shaft 87 may be forced against the rack to cause the latter to engage with the pinion 65. A spring 91 is connected to the end of the rack 77 and a fixed part of the washer, as a leg 2 thereof, for the purpose of automatically disengaging the rack from the pinion and to hold the rack away from the pinion when the handle 90 is shifted to throw the lever 83 out of operation and thus stop the oscillation or rotation of the gyrator. The spring constantly tends to hold the rack away from the pinion and against the roller 84, the rack being thrown into mesh with the pinion only when the lever 83 and roller 84 are moved to positively shift the rack into enmeshment. The rotation of the crank 79–80 will cause a reciprocation of the rack over the arm 76 whether or not the rack be in engagement with the pinion. When the rack is moved into mesh with the pinion, the later is caused to alternately rotate and through the medium of shaft 52 impart such movement to the gyrator in the tub.

For the purpose of packing the gyrator shaft 52 the plate 47 and the bracket 69 are provided with communicating chambers adapted to hold a packing material 92, preferably composed of chopped or shredded and comminuted asbestos, graphite and oil. The packing space comprises an annular chamber 93 surrounding the shaft 52 between the bearing 67 and bushing 70, and a washer or packing 94, preferably of leather, in the opening at the top of the chamber 93 and located between the bottom end 95 of the step 59 and the packing material in the chamber 93. The chamber 93 extends through a passage 96 to a plunger chamber 97. The lower portion 98 of the latter has a screw threaded aperture in which operates a screw plunger 99 having at its outer end a winged finger piece 100 which may be manually rotated to feed the plunger into the chamber 97 against the packing 92. The packing 92 is somewhat plastic and is in a sort of fluidal state so that the stress applied to it by the forceful entry of the screw plunger into the chamber 97 will cause the packing 92 to flow through the passage 96 to the chamber 93 and completely fill the space of the latter. In this way compensation for any loss of packing owing to wear, leakage and otherwise is readily made. Leakage of wash water or cleansing fluid from the tub around the shaft 52 is prevented by this novel packing means.

The open top of the tub is normally closed by a cover 101 having a hinge 102 at one side and a finger grip piece 103 at the other side.

At one side of the tub is secured a liquid soap dispenser comprising a reservoir 104 fastened to the wall 48 by bolts 105 and adapted to contain a relatively large supply of soap. To this chamber is connected a measuring pump 106 into the upper portion of which a charge of fluid soap is drawn by the piston on piston rod 107, and upon a downward movement of the piston and rod, discharged into the tub through a discharge tube or nozzle 108 so located that the ejected charge will be in the general direction of the movement of the mass of material and cleansing solution within the tub during the washing operation.

When the gyrator is alternately rotated or oscillated, with materials to be cleansed and the cleansing liquid in the tub, the liquid is given a radially outward and upward movement toward the upper part of the tub, then an inward movement, then a downward movement toward the cone 53 of the gyrator, the liquid also progressing, in its whirling action, about the tub first in one direction and then in an opposite direction so that the resultant motions are substantially gyratory ones, as helical movements about a ring having a circular cross-section. In this way the washing and washable materials are given a turbulent swirling action. As a result of this action imparted to the cleansing liquid by the gyrator, the water in turn imparts a similar action to the fabrics. Goods are thus whipped, whirled and dashed around in the sieving, whirling, turbulent action set up by the gyrator. Thus the fabrics are given a quick, snappy, sieving, whirling, reversing double action, produced by the gyrator, doubling the clothes first one way and then the other until every thread in the fabric is acted upon an untold number of times, somewhat like the cracking of a whip-lash in all directions. While it is very difficult to describe the action of the water and the movement of the clothes therein produced by the rapid reciprocation of the gyrator or impeller in the container, whereby the materials are thoroughly cleansed while held in suspension by the peculiar and novel movement and action of the water, I believe that the foregoing description will easily enable anyone skilled in the art to readily construct and operate my invention and fully utilize the herein disclosed method. At or before the start of the operation, and during the operation of the machine, as desired, charges of liquid soap may be ejected into the moving mass in the tub.

The plate 47 has a drain port 109 with which may be connected a hose normally supported at its free end at one side of the machine but which may be lowered to drain the tub of its contents. The plate 47 is formed with a shallow depression 110 surrounded by the flange 50 and having an inclined bottom 111 extended from one side to the other of the shaft 52 and chamber 93, in order to permit efficient drainage of the fluids in the tub through drain port 109.

It is of course understood that the specific description of structure set forth above may be departed from without departing from the spirit of my invention as set forth in this specification and the appended claims.

Having now described my invention, I claim:

1. The method of cleansing fabrics in a tub consisting in agitating a washing fluid in such a way as to create positively driven violently flowing currents moving away from and back to the plane of the source of agitation, and also around the tub in one direction in a plane approximately parallel with the plane of agitation, and then causing it to move away from and back to the plane of the source of agitation and in a reverse direction in a plane approximately parallel with the plane of agitation so as to bodily and forcibly cause the fabrics in the tub to travel in substantially the same paths as the fluid, whereby thorough cleansing of the fabric is effected without substantial contact with rubbing surfaces.

2. A washing machine comprising in combination, a container having a substantially uninterrupted inner surface, a rotary reciprocatory disk-like impeller near the bottom of the container having upstanding flanges thereon so arranged as to violently force water in the container laterally and upwardly in one gyratory direction and then laterally and upwardly in an opposed direction, whereby the materials being washed will be substantially suspended by the water and thoroughly cleaned while thus suspended, and motor-driven means extending through the bottom of the container to rotatably reciprocate the impeller.

3. A washing machine comprising in combination, a container having a substantially uninterrupted inner surface, a rotary reciprocatory disk-like impeller mounted adjacent the bottom of the container, so constructed and arranged that when water and materials to be cleaned are placed in the container and the impeller is reciprocated, the water will first be violently forced laterally and upwardly in one gyratory direction and then laterally and upwardly in an opposed gyratory direction, so that the materials being cleaned will be suspended by the movement of the water, and the water forced through and around the materials to thoroughly cleanse them, while said materials are substantially out of rubbing contact with the mechanical parts of the machine, and motor-driven means for rapidly driving the impeller.

4. In a washing machine the combination of a tub for containing a cleansing substance and the materials to be cleansed, said tub having an outwardly and upwardly inclined portion, an impeller cooperating with the said inclined portion of the tub to force said cleansing substance and materials to be cleansed outwardly in a direction substantially parallel with said inclined portion, and power means for oscillating said impeller.

5. In a washing machine the combination of a tub adapted to contain wash water and goods to be washed, said tub having a flared portion, a liquid impeller in said tub, having a depressed portion, said liquid impeller cooperating with said flared portion to swirl said wash water and goods with a substan-

tially gyratory movement, and power means to alternately rotate said liquid impeller.

6. In a washing machine comprising driving power means, the combination of a tub for containing a cleansing substance and materials to be cleansed, a liquid impeller mechanism driven by said power means for oscillating said liquid impeller, said liquid impeller having flanges and a radially depressed portion operative to upwardly swirl said cleansing substance and material.

7. In a washing machine comprising a driving power means, the combination of a tub for containing washing and washable materials, a liquid impeller, means operable to alternately rotate said liquid impeller, said liquid impeller being provided with upstanding flanges and a depressed portion on each side of each of said flanges and operative to swirl said materials with a substantially gyratory movement.

8. In a washing machine comprising driving power means, the combination of a tub for containing a cleansing substance and materials to be cleansed, a liquid impeller, mechanism driven by said power means for alternately rotating said liquid impeller, said liquid impeller having upwardly and radially extending flanges and a radially depressed surface operative to upwardly swirl said cleansing substance and materials.

9. In a washing machine comprising driving power means, the combination of a tub adapted to contain washing and washable materials, a liquid impeller in said tub and operated by said means, said liquid impeller having a centrally raised portion and radially depressed portion, and operable to swirl said materials with a substantially gyratory movement.

10. In a washing machine having driving power means, the combination of a tub adapted to contain washing and washable materials, a liquid impeller in said tub and operated by said means, said liquid impeller having a centrally raised portion, a radially depressed portion and flanges extending radially from said centrally raised portion, said liquid impeller operable to swirl said materials with a substantially gyratory movement in said tub.

11. In a washing machine having driving power means, the combination of a tub adapted to contain washing and washable materials, a liquid impeller in said tub and operated by said means, said liquid impeller having a central conodial portion, an inclined peripheral portion and an intermediate trough portion, said liquid impeller operating to swirl said materials with a substantially gyratory movement in said tub.

12. In a washing machine comprising driving power means, the combination of a tub for holding a cleansing fluid and materials to be cleansed, a drain plate at the bottom of said tub and having a sloping bottom portion extending from one side to the other of the center of said tub, and an eccentrically located drainage connection attached to said inclined portion, a shaft extending through said plate and a liquid impeller on said shaft for giving said substance and material turbulent motion.

13. In a washing machine comprising a driving power means, a tub, an alternating rotary liquid impeller having a plate formed with an annular depression, a raised central portion and upstanding flanges in said depression, said plate, depression, central portion and flanges operating on the contents of the tub to give the contents a gyratory movement.

14. An agitating member for a washing machine comprising a cup-shaped disk having a frusto-conical portion rising from the center thereof, the vertical elements of which are concave so that the surface of said portion merges into the surface of said disk, and a round upwardly tapering portion projecting above said frusto-conical portion and terminating in a rounded surface, and narrow radial wings projecting from said latter portion and extending along the sides thereof and across the surface of said disk and having rounded outer edges merging into the concave surface of said disk.

15. An impeller for a washing machine comprising an annular trough, a stem rising centrally from said trough and having a plurality of circumferentially spaced radial wings projecting therefrom and extending along its sides and across the surface of said trough, the top surface of said wings above said trough curving downwardly and inwardly.

16. A rotatable impeller for a washing machine adapted to be disposed in a liquid containing receptacle comprising a dish-shaped member having a central upstanding tapered stem with a rounded upper end, ribs extending across said dish and upwardly along the side of said stem and having rounded upper edges merging into the rounded surface of said stem.

17. In a washing machine, a tub for containing wash water and goods to be washed, an oscillatory disk-like agitator in said tub near the bottom thereof and having a plurality of upstanding water-impelling projections extending from one face thereof, said projections being of substantial height contiguous to the periphery of the agitator and decreasing in height toward the center whereby side faces of substantial area are provided, and while the agitator is oscillated the water and goods will be vigorously forced laterally upwardly in gyratory paths to violently force the water through, between and around the goods and thoroughly cleanse them while

they are sustained in the water free from any substantial contact with rubbing surfaces, and motor-driven means for oscillating the agitator.

18. In a washing machine an agitator and power means for imparting alternate rotative movement thereto, said agitator consisting of a substantially disk-like imperforate body and a plurality of liquid impelling projections extending from one face thereof, said projections being of a maximum depth contiguous to the periphery of said body and having their free edges inclined inwardly to the center of the agitator, leaving the central portion of said body free of water impelling projections.

19. In a washing machine, a tub having side walls and a bottom, a driving shaft extending through said bottom into the tub, an agitator fixed to said shaft to oscillate therewith, power means for oscillating said shaft and agitator, said agitator comprising a substantially circular base having an upstanding central portion, blades extending upwardly from the upper face of said base, the blades being of greatest height adjacent the marginal edge of the base, decreasing in height toward the center and merging into said upstanding central portion, the union between the agitator and the shaft permitting removal of the former from the latter by an upward movement, the oscillation of the agitator causing the blades to set up violent movements of the fluid and tub contents outwardly away from the agitator, upwardly, inwardly and then back toward the agitator, there also being superposed on this circulatory movement a movement of the fluid and tub contents first in one direction circumferentially of the tub and then in the other, so that the articles being washed will be thoroughly cleansed without any material rubbing of the blades thereagainst.

20. In a washing machine, a tub, a driving shaft extending into the tub, an agitator secured to said shaft to oscillate therewith, power means for oscillating said shaft and agitator, said agitator comprising a substantially circular body portion having blades extending therefrom on the face presented to the material being washed, the blades adjacent the marginal edge of the body portion being of a substantial dimension in a direction at right angles to the body portion, said body portion being free of any holes or openings of substantial dimensions, said blades and adjacent portions of the body portion of the agitator when the agitator is oscillated throwing the fluid in the tub, and material being washed, violently outwardly from the edge of the agitator whereby it will flow in circulatory paths away from the agitator, along the sides of the tub, then inwardly and back toward the agitator, this cycle being continuously repeated.

21. In a washing machine, a tub having a substantially uninterrupted inner surface and adapted to contain cleansing liquid and materials to be washed, the bottom of the tub merging smoothly into the sides, an oscillatory liquid impeller mounted adjacent the bottom of the tub, having on its upper surface upstanding wing-like means of substantial height and length so constructed and arranged that when the impeller is given a rapid rotary oscillatory movement the cleansing liquid and materials to be washed will be violently forced laterally from the impeller then upwardly along the side of the tub, then away from the tub side and back toward the impeller, this cycle being continuously repeated to force the cleansing liquid through and around the materials to be washed to thoroughly cleanse them while they are substantially out of rubbing contact with the impeller, and motor-driven means for imparting to said impeller a rapid rotary oscillatory movement.

22. A washing machine comprising in combination, a tub for containing cleansing liquid and materials to be cleansed, said tub having a bottom portion, and an upwardly extending wall portion the interior surface of which is free from rubbing projections, the juncture of the bottom portion with the upwardly extending portion being inclined to facilitate the movement of currents outwardly and upwardly and along the interior surface of the tub, a rotary reciprocatory impeller mounted in the tub adjacent its bottom, the upper surface area of which is considerably less than the horizontal cross-sectional area of the tub through its upwardly extending portion, the margin of said impeller being spaced a substantial distance away from the upwardly extending portion of the tub, a rotary reciprocatory drive shaft extending upwardly through the bottom of the tub into the interior thereof, the impeller being mounted upon said shaft for movement therewith in a fixed plane, said impeller having on its upper surface a plurality of upstanding wing-like blades, each of which is of substantial height and length, and provided with lateral impelling faces of substantial area, the impeller and tub being so constructed and arranged relative to each other as to cooperate while the impeller is reciprocated for whipping the fluid and violently forcing it first in one and then in an oppositely upward circulatory direction against the interior of the tub and through and around the materials being washed, and substantially suspending the materials in the fluid by the moving fluid, and means for imparting a rapid rotary reciprocatory motion to the said shaft and impeller.

23. A washing machine comprising in combination, a tub for containing cleansing liquid and materials to be cleansed, said tub hav-

ing a bottom portion and an upwardly extending wall portion, the interior surface of which is free from rubbing projections, a rotary reciprocatory impeller mounted in the tub adjacent its bottom, having a base and a plurality of blades, each of which is of substantial height and lateral area, and a central portion projecting upwardly from the base, the upper surface area of the base being considerably less than the horizontal cross-sectional area of the tub through its upwardly extending portion, the margin of said base being spaced a substantial distance away from the upwardly extending portion of the tub, said tub and impeller being so constructed and positioned relative to each other that when the impeller is rapidly reciprocated each blade and its adjacent portion of the impeller base will simultaneously drive the cleansing fluid in one and then an opposite outward upward circulatory direction toward and around the clothes, and act in cooperation with the interior of the tub to cause violently flowing opposed currents of liquid to meet and flow inwardly and downwardly toward the central portion of the tub, and substantially suspend the materials in the fluid while being washed, a rotary reciprocating drive shaft extending upwardly through the bottom of the tub into the interior thereof for supporting the impeller for movement in a fixed plane, and power means for rapidly reciprocating the shaft and impeller, for the purposes set forth.

24. In a washing machine, a tub adapted to contain a washing fluid and materials to be cleansed, a rotatively reciprocatory driving shaft extending through the bottom of the tub at the center thereof, a liquid impeller mounted on said shaft near the bottom of the tub, the outer portion of the impeller being spaced a considerable distance from the interior side surface of the tub and rotatively reciprocatory with the shaft, said impeller comprising a base, a central portion projecting upwardly therefrom and a plurality of uniform blades projecting upwardly from the base and equally spaced and extended radially from the central portion, each blade being of greater area at a position contiguous to the edge of the base than at the center thereof, and means for imparting rotary reciprocatory motion to said shaft and the impeller mounted thereon, the impeller and the tub being so constructed and relatively positioned as to cooperate while the impeller is reciprocated to cause the liquid to be violently forced laterally and upwardly against and in one direction, circumferentially around the inner surface of the tub, and laterally and upwardly against and in an opposite direction, circumferentially around the inner surface of the tub whereby the materials will be thoroughly cleansed while substantially suspended in the water.

25. A washing machine comprising in combination, a tub, said tub having a main body portion, the interior of which is substantially free of scrubbing projections, and a bottom portion, a rotary reciprocatory liquid impeller mounted for operation in a fixed plane in the tub, the outer portion of which is spaced a considerable distance from the body portion of the tub and having a plurality of blades projecting therefrom, said tub and impeller being so constructed and positioned relative to each other that when the impeller is rapidly reciprocated each blade and its adjacent portion of the impeller base will simultaneously drive the cleansing fluid in one and then an opposite outward circulatory direction away from the plane of the impeller through and around the clothes, and act in cooperation with the interior of the tub to cause violently opposed currents of fluid to meet and flow inwardly and in a general vertical direction toward the impeller, whereby the materials are substantially suspended in the fluid and cleansed while thus suspended, a driving shaft extending into the tub on which the impeller is mounted for movement therewith, and power means for rapidly reciprocating the shaft and impeller.

26. In a washing machine for cleansing fabrics by forcing cleansing fluid through them while substantially suspended by the action of the fluid, as distinguished from pulling or pushing the fabrics through the fluid or against scrubbing surfaces, or otherwise scrubbing them by mechanical means, a tub, a substantially imperforate rotary reciprocatory impeller mounted to operate in a fixed plane having blades of substantial height and area projecting therefrom in a direction toward the fabrics while they are being cleansed, said tub and impeller being so constructed and arranged as to cooperate while the impeller is in operation for whipping the fluid and violently forcing it outwardly, upwardly and in a general vertical and circulatory movement and circumferentially of the tub first in one and then in an opposite direction and through and around the materials, and substantially suspending the materials in the fluid while being washed, and power means for rapidly reciprocating the impeller.

27. A washing machine comprising in combination, a tub having an inner surface free from rubbing projections, said tub having a vertical portion and a bottom portion inclined outwardly and upwardly toward and merging with the vertical portion, an imperforate rotary reciprocatory impeller mounted for operation in a fixed plane near the bottom of the tub, the outer portion of which is spaced a considerable distance from the interior of the vertical portion of the tub, said impeller comprising a base of substantial area, a plurality of uniform radially dis-

posed and equally spaced blades projecting upwardly at substantially right angles from the base, each blade being of substantial height and lateral area, and a central portion projecting upwardly from the base, a driving shaft extending through the bottom of the tub on which the impeller is mounted for movement therewith, and means mounted beneath the tub for imparting to the shaft and impeller a rapid rotary reciprocatory motion.

28. In a washing machine, a tub having a substantially smooth inner surface free from rubbing projections, adapted to contain cleansing liquid and materials to be cleansed, said tub having a vertical portion and a portion inclined downwardly and inwardly from the vertical portion and merging therewith, an imperforate rotary reciprocatory impeller mounted near the bottom of the tub, the outer portion of which is spaced a considerable distance from the interior of the vertical portion of the tub, comprising a base of substantial area and a plurality of uniform equally spaced radially disposed blades projecting upwardly from the base, each blade being of substantial height and lateral area at its outer end and decreasing in its lateral area toward its inner end, and a central portion projecting upwardly from the base into which the inner end of each of said blades merges, a driving shaft extending through the bottom of the tub on which the impeller is mounted for movement therewith, and means mounted beneath the tub for imparting to said shaft and impeller a rapid rotary reciprocatory motion.

29. In a washing machine, a tub adapted to contain cleansing liquid and materials to be cleansed, a rotary reciprocatory impeller mounted adjacent the bottom of the tub, comprising a substantially imperforate base of substantial area and blades of substantial height and lateral area projecting from the body of the impeller toward the materials while being washed, said impeller and tub being so constructed and arranged that they will cooperate, when the impeller is rapidly reciprocated, to cause the liquid to be positively forced outwardly, upwardly and circumferentially along the interior of the tub in one general direction, and then outwardly, upwardly and circumferentially along the tub in the opposite general direction, whereby the materials being washed will be cleansed, the change in direction of movement of the impeller being accomplished suddenly and forcibly to whip the liquid and vigorously force it first in one direction and then in the opposite direction through and around the materials while substantially suspended therein by the action of the liquid, and power means for rapidly reciprocating the impeller.

30. In a washing machine, a tub having its bottom merging smoothly into its side portion to facilitate the movement of laterally upward circulatory currents, and having the interior of its side portion substantially smooth and free from rubbing elements, for containing a cleansing fluid and materials to be cleansed, a rotary reciprocatory impeller mounted near the bottom of the tub, said tub and impeller being so constructed and arranged as to act in cooperation while the impeller is in operation, for whipping the fluid and violently forcing it first in one and then in an opposite laterally upward circulatory general direction against the interior of the tub and through and around the materials, and suspending the materials in the fluid by the moving fluid while being washed, said impeller comprising a substantially imperforate base and blades of substantial height and area projecting upwardly therefrom, and motor driven means extending through the bottom of the tub for imparting to the impeller a rapid rotary reciprocatory motion, substantially as described.

31. In a washing machine, a tub having a substantially smooth interior free from rubbing elements for containing a cleansing fluid and materials to be cleansed, a rotary reciprocatory impeller mounted near the bottom of the tub, said tub and impeller being so constructed and arranged as to cooperate while the impeller is operated for violently forcing the fluid first in one and then in an opposite outwardly and upwardly circulatory general direction against the interior of the tub and through and around the materials, and substantially suspending the materials in the fluid while being washed, said impeller comprising a substantially imperforate base and blades of substantial height and area projecting upwardly therefrom, and motor driven means extending through the bottom of the tub for imparting to the impeller a rapid rotary reciprocatory motion.

32. In a washing machine for cleansing fabrics by forcing cleansing fluids through them while substantially suspended by the action of the fluids as distinguished from pulling or pushing fabrics through fluids or against scrubbing surfaces or otherwise scrubbing them by mechanical means, a tub, a rotary reciprocatory impeller mounted for normal operation in a fixed plane, said tub and impeller being so constructed and arranged to cooperate while the impeller is in operation for whipping the fluid and violently forcing it first in one and then in an opposite outward, axial and circulatory general direction against and approximately parallel to the interior of the tub and through and around the materials and substantially suspending the materials in the fluid while being washed, said impeller comprising an imperforate base and blades of substantial height and area projecting therefrom in a direction toward the materials being cleansed, and power

means for rapidly reciprocating the impeller.

33. In a washing machine, a tub substantially free from scrubbing projections for containing a cleansing fluid and materials to be cleansed, a rotary reciprocatory impeller mounted near the bottom of the tub, said impeller comprising an imperforate base and blades of substantial height and area projecting upwardly therefrom, said tub and impeller being so constructed and arranged as to act in cooperation while the impeller is operated for whipping the fluid and violently forcing it first in one and then in an opposite outwardly upwardly circulatory general direction, against the interior of the tub and toward and through the materials, and substantially suspending the materials in the fluid while being washed, and power means for rapidly reciprocating the impeller.

34. In a washing machine, a tub whose interior is free from substantial scrubbing elements adapted to contain a cleansing fluid and materials to be cleansed, a driving shaft extending into the tub through the bottom thereof, an impeller on said shaft to oscillate therewith, power means for oscillating said shaft and impeller, the impeller comprising an imperforate body portion, and blades extending from said body portion on the face presented to the materials being cleansed, the blades being of a substantial dimension in a direction at right angles to the body portion, said tub, blades and adjacent portions of the body portion of the impeller being so constructed and arranged in the tub relative to its interior that when the impeller is oscillated the fluid in the tub will be thrown violently outward against and around the interior of the tub, from the edge of the impeller, first in one and then in the opposite general direction, whereby the fluid will be driven in circulatory paths away from the impeller, along the sides of the tub in opposed directions, then inwardly and toward the impeller, this cycle being continuously repeated while the materials are substantially suspended by the fluid and out of substantial scrubbing contact with the impeller or tub.

35. A washing machine comprising in combination, a tub for containing water and goods to be washed, said tub being substantially free from rubbing projections, a rotary reciprocatory impeller in the tub having flange-like means extending therefrom of substantial height and lateral area, said tub and impeller, together with its flange-like means, being so constructed, proportioned and arranged with respect to each other that while the impeller is in operation the fluid will be rigorously moved about in devious paths within the tub, and the resultant general direction of the movement of the cleansing fluid and the materials to be cleansed is normally radially outward from the central portion of the tub, then vertically, and a general rotary progression about the inside of the tub first in one and then an opposite direction, and then inwardly toward the impeller whereby the fabrics will be cleansed while substantially sustained by the action of the fluid, and will be freely and continuously driven about in the fluid by the movements thereof in a turbulent manner, and in devious paths, and motor driven means for rapidly reciprocating the impeller for the purposes set forth.

36. In a washing machine, a tub free of scrubbing elements for containing a cleansing fluid and materials to be cleansed, an imperforate rotary reciprocatory impeller, blades on the impeller, said tub and impeller together with its blades being so constructed and arranged with respect to each other that while the impeller is in operation the fluid will be rigorously moved about in devious paths within the tub, and the resultant general direction of the movement of the cleansing fluid is normally radially outward from the central portion of the tub, then vertically and in a general rotary progression about the inside of the tub, first in one and then in an opposite direction, and then inwardly toward the impeller, whereby the fabrics will be cleansed while substantially sustained by the action of the fluid and will be freely and continuously driven about in the fluid by the movements of the fluid in a turbulent manner and in devious paths, and power means for imparting reciprocations to the impeller.

37. In a washing machine, a tub for containing fluid and materials to be cleansed, a rotary reciprocatory impeller mounted for oscillation in a substantially fixed plane having a substantially imperforate base and a plurality of blades, said tub and impeller being so constructed and positioned relative to each other that when the impeller is rapidly reciprocated each blade and its adjacent portion of the impeller base will simultaneously drive the cleansing fluid in one and then an opposite outward, upward, circulatory direction and act in cooperation with the interior of the tub to cause violently opposed currents of fluid to meet and flow inwardly and downwardly toward the central portion of the tub and substantially suspend the materials in the fluid while being washed, and power means for rapidly reciprocating the impeller.

38. The method of washing fabrics by forcing cleansing liquid through and around them while substantially suspended by the action of the fluid, as distinguished from pulling fabrics through the fluid against scrubbing corrugations, or otherwise scrubbing them by mechanical means, comprising immersing the fabrics in a washing fluid in a container, then vigorously and rapidly impelling the washing fluid in one and then in an opposite outward circulatory direction away from the plane of the source of impul-

sion and through the fabrics and circumferentially along the interior of the container in rapid succession, and causing these violently opposed currents of fluid to meet and flow inwardly and toward the central portion of the container, and toward the source of impulsion thereby substantially suspending the fabrics in the fluid and cleansing them while thus suspended.

39. The method of washing fabrics by forcing cleansing fluid through them while substantially suspended by the action of the fluid, as distinguished from pulling fabrics through the fluid against scrubbing corrugations, or otherwise scrubbing them by mechanical means, comprising immersing the fabrics in a washing fluid in a container, then vigorously agitating the washing fluid and rapidly forcing it toward the fabrics and away from the plane of the source of agitation vertically along the interior surface of the container first in one and then in an opposite circumferential direction, back and forth through and around the fabrics, and causing the violently moving opposed currents of liquid to meet and flow inwardly and vertically toward the source of agitation whereby the fabrics are caused to be freely moved about by the action of the fluid and cleansed while thus moved.

In witness whereof, I hereunto subscribe my name to this specification.

HOWARD F. SNYDER.

2011

Plaintiff's Exhibit No. 2.

DEPARTMENT OF COMMERCE

UNITED STATES PATENT OFFICE

To all persons to whom these presents shall come, Greeting:

THIS IS TO CERTIFY that the annexed is a true copy from the records of this office of Disclaimer, filed February 23, 1937, in the matter of the

2012

Letters Patent of
Howard F. Snyder, Assignor, by Mesne Assignments, to The Maytag Company,

Number 1,866,779, Granted July 12, 1932,

for

Improvement in Washing Machines.

2013

IN TESTIMONY WHEREOF I have hereunto set my hand and caused the seal of the Patent Office to be affixed, at the City of Washington, this twentieth day of (SEAL) March, in the year of our Lord one thousand nine hundred and thirty-seven and of the Independence of the United States of America the one hundred and sixty-first.

CONWAY P. COE,
Commissioner of Patents.

ATTEST:

D. E. WILSON,
Chief of Division.

E71

2014 *Plaintiff's Exhibit No. 2.*

IN THE UNITED STATES PATENT OFFICE

In the matter of

Letters Patent No. 1,866,779
Issued July 12, 1932

To Howard F. Snyder
For Washing Machines

2015

Recorded
U. S. Patent Office
Issue Division

Feb 23 1937
Liber 3 Page 549

DISCLAIMER

To the Honorable Commissioner of Patents:

2016 Your Petitioner, The Maytag Company, a corporation of Delaware, having a place of business at Newton, Jasper County, Iowa, represents that Letters Patent of the United States No. 1,866,779, were granted to it, as assignee of Howard F. Snyder, on July 12, 1932, for a certain improvement in Washing Machines, and that it is now the sole owner of the entire right, title and interest in and to said Letters Patent; that it has just become aware of reasons to believe that through inadvertence, accident or mistake, and without any fraudulent or deceptive intention or willful default, the patentee claimed more than that of which he was the original or first inventor or discoverer in the following claims, to-wit:

Plaintiff's Exhibit No. 2. 2017

"1. The method of cleansing fabrics in a tub consisting in agitating a washing fluid in such a way as to create positively driven violently flowing currents moving away from and back to the plane of the source of agitation, and also around the tub in one direction in a plane approximately parallel with the plane of agitation, and then causing it to move away from and back to the plane of the source of agitation and in a reverse direction in a plane approximately 2018
parallel with the plane of agitation so as to bodily and forcibly cause the fabrics in the tub to travel in substantially the same paths as the fluid, whereby thorough cleansing of the fabric is effected without substantial contact with the rubbing surfaces.

"38. The method of washing fabrics by forcing cleansing liquid through and around them while substantially suspended by the action of the fluid, as distinguished from pulling fabrics through the fluid against 2019
scrubbing corrugations, or otherwise scrubbing them by mechanical means, comprising immersing the fabrics in a washing fluid in a container, then vigorously and rapidly impelling the washing fluid in one and then in an opposite outward circulatory direction away from the plane of the source of impulsion and through the fabrics and circumferentially along the interior of the container in rapid succession, and causing these violently opposed currents of fluid to meet and flow inwardly and toward the central portion of the container, and toward

2020 *Plaintiff's Exhibit No. 2.*

"the source of impulsion thereby substantially suspending the fabrics in the fluid and cleansing them while thus suspended."

And your Petitioner therefore hereby enters its disclaimer of the above claims of said Letters Patent.

Your Petitioner avers that the subjects matter of the remaining claims of said Letters Patent are the invention of said Snyder and are a
2021 material and substantial part of the thing patented, and are definitely distinguishable from the matter herein disclaimed.

Your Petitioner herewith tenders the sum of Ten ($10.00) Dollars to be applied as the statutory fee for entering this disclaimer.

Signed at Newton, in the County of Jasper, and State of Iowa, this 20th day of February, 1937.

THE MAYTAG COMPANY
By ROY A. BRADT
Vice President

2022

ATTEST:

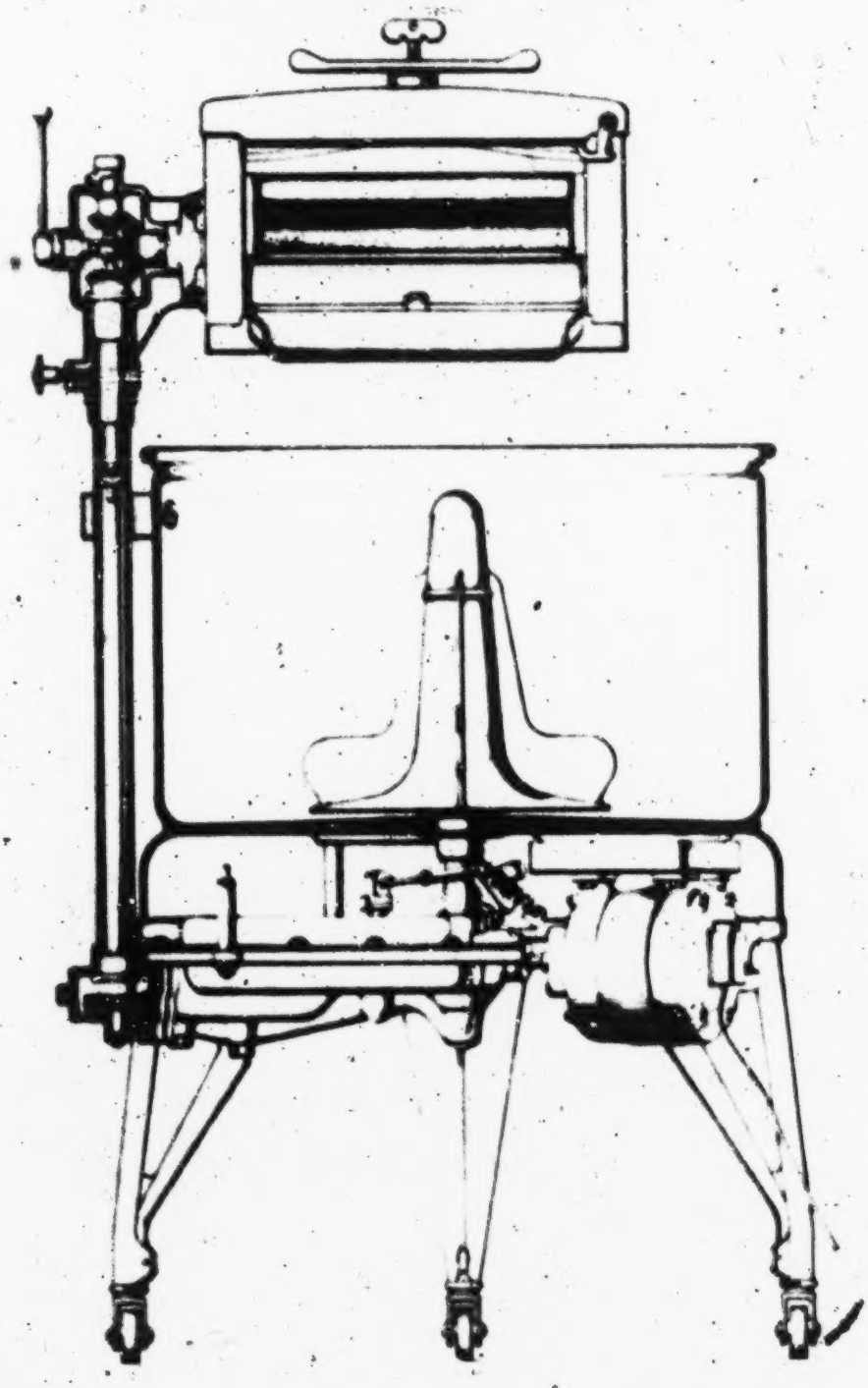
E. L. NELSON
Assistant Secretary

WITNESS:

E. G. HIGDON
GEO. M. UMBREIT

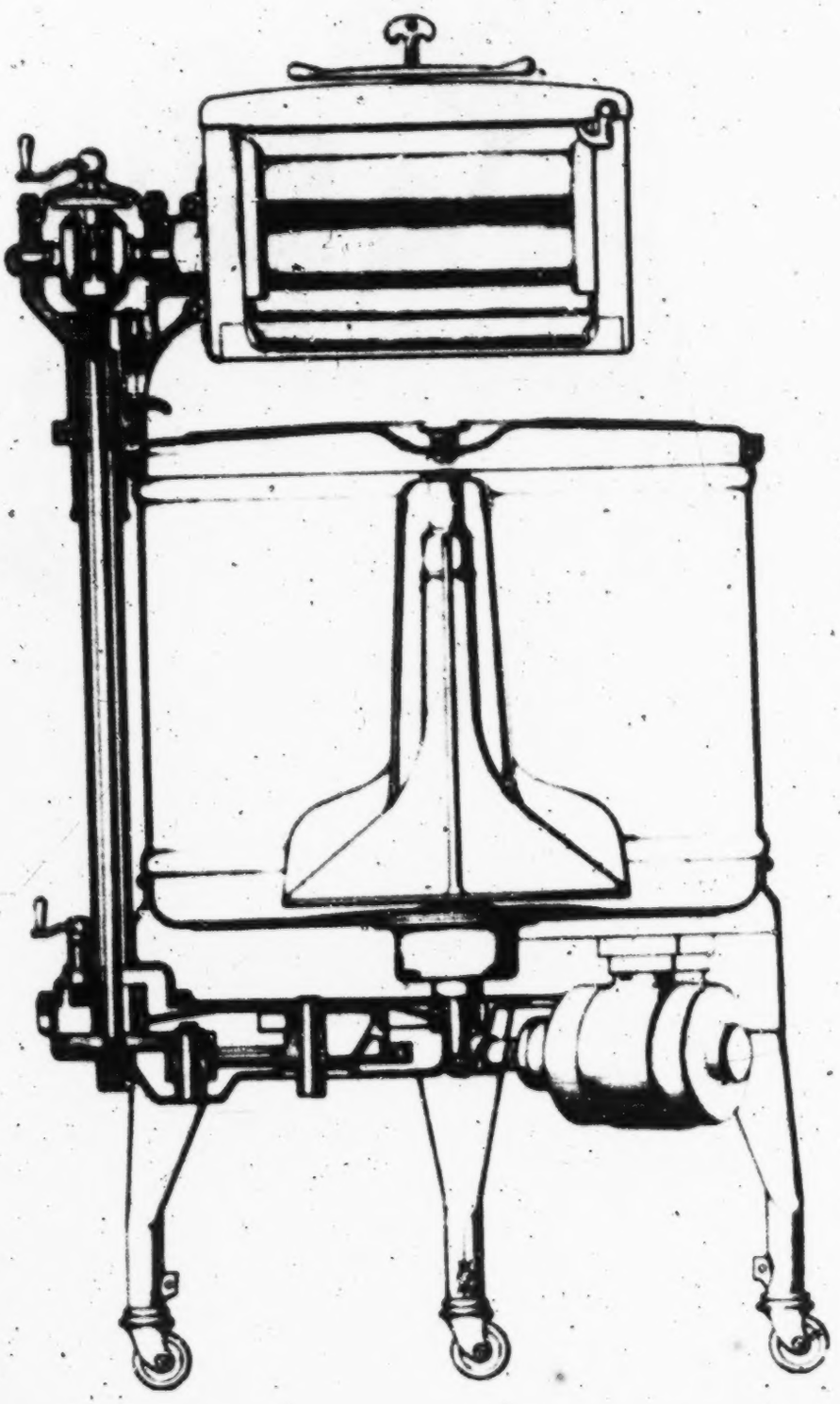
PLAINTIFF'S EXHIBIT No. 3A

DEFENDANT
EASY WASHING MACHINE CORPORATION
WASHING MACHINE
CHARGED TO INFRINGE



PLAINTIFF'S EXHIBIT No. 4A

DEFENDANT
HURLEY MACHINE CO
WASHING MACHINE
CHARGED TO INFRINGE.
THOR.



PLAINTIFF'S EXHIBIT No. 5

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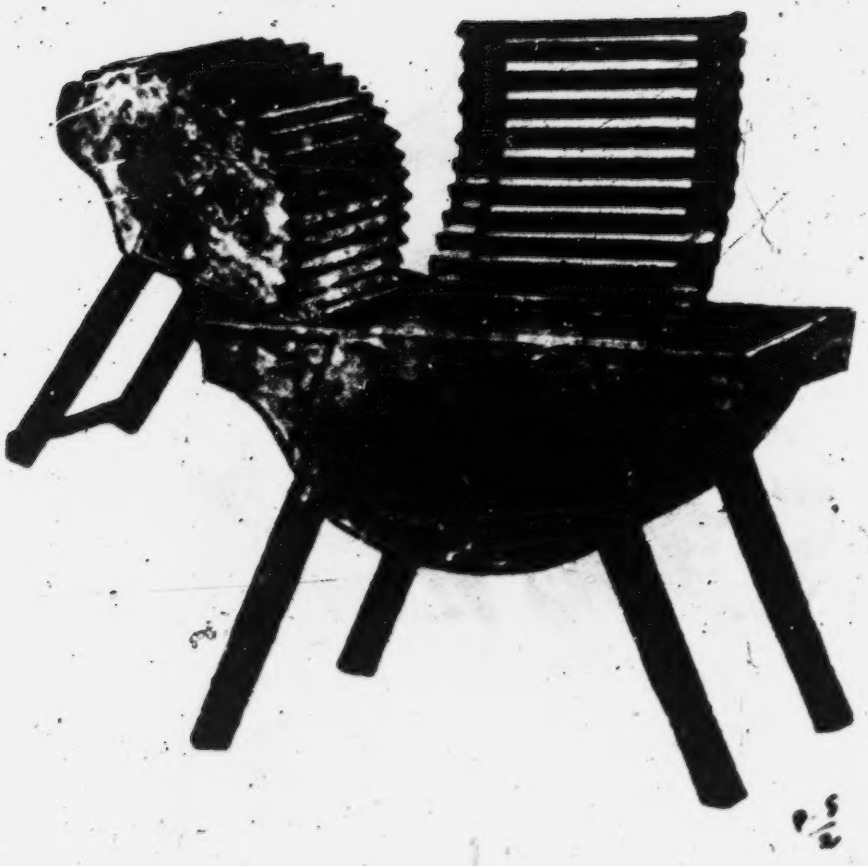
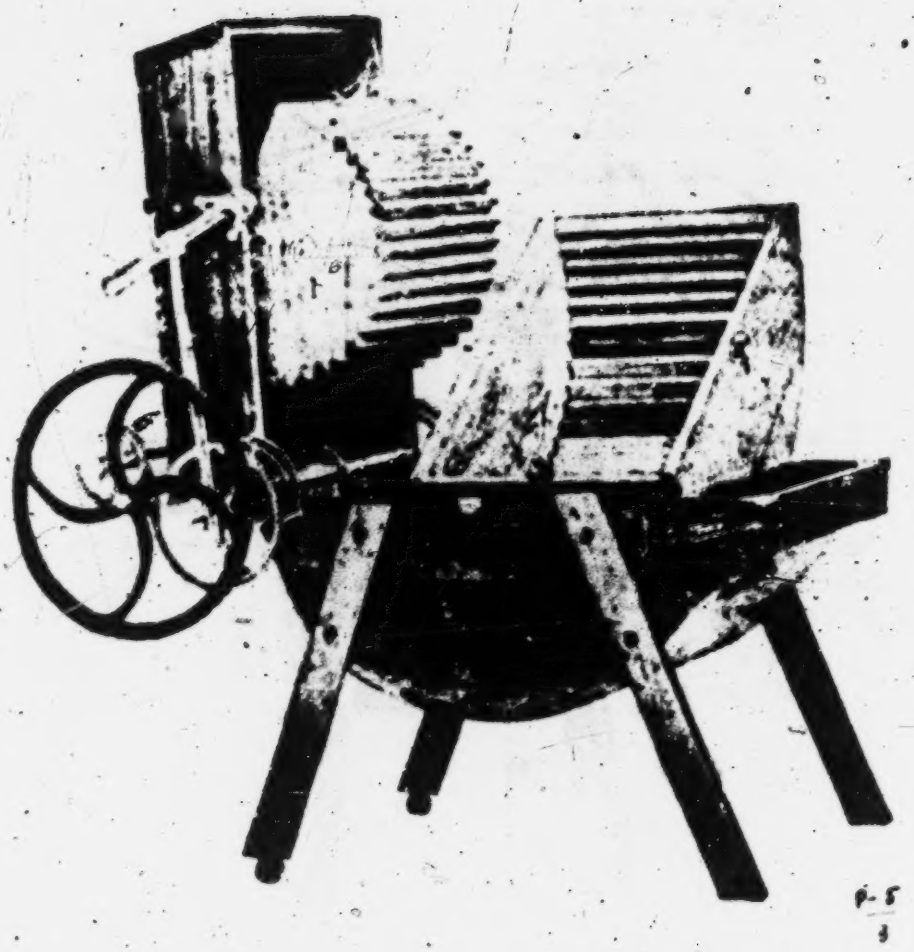
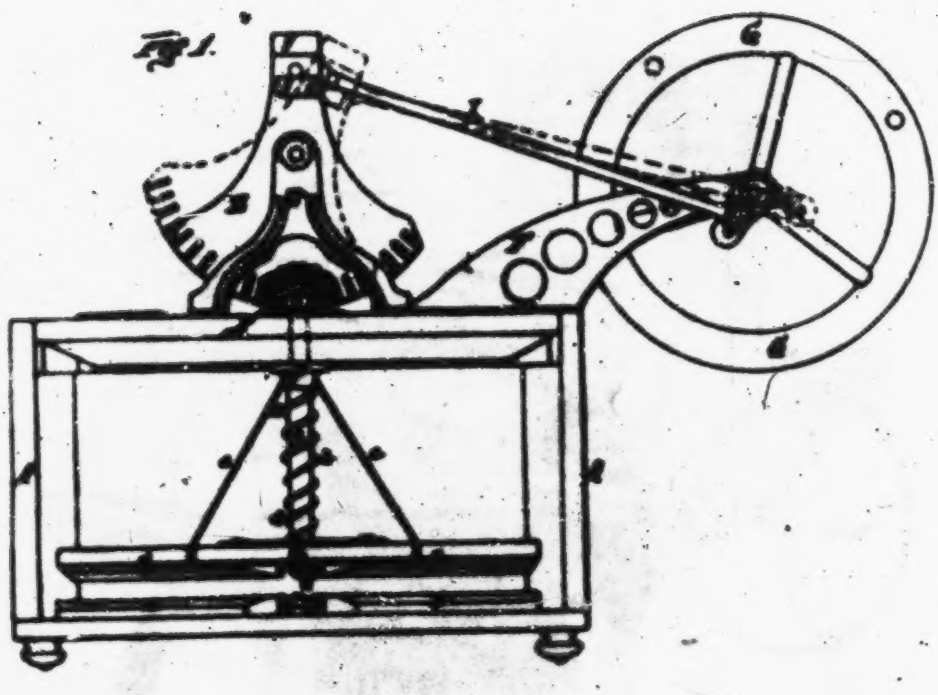
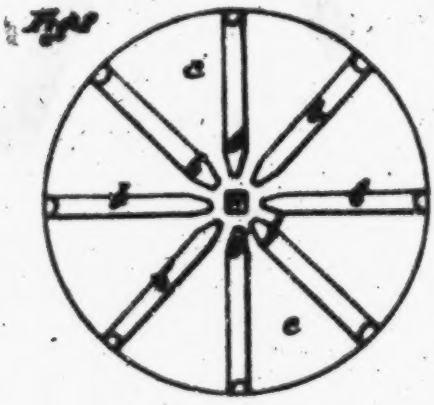






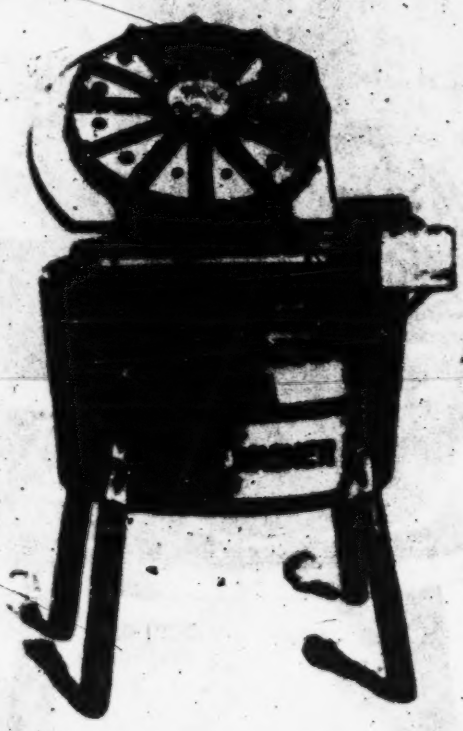


THE DIETZ RUBBOARD POWER WASHER

¶ This machine is especially adapted for washing fine garments and laces, but can also be used for ordinary clothes. The tub is the same high quality as used in the Dietz machine. The washer in this machine, you will notice, is a large circular rubboard, covering the entire circumference of tub. It has large ribs which greatly rub the clothes while carrying them through the water, the large holes

Insist on The Dietz — there is none just as good.

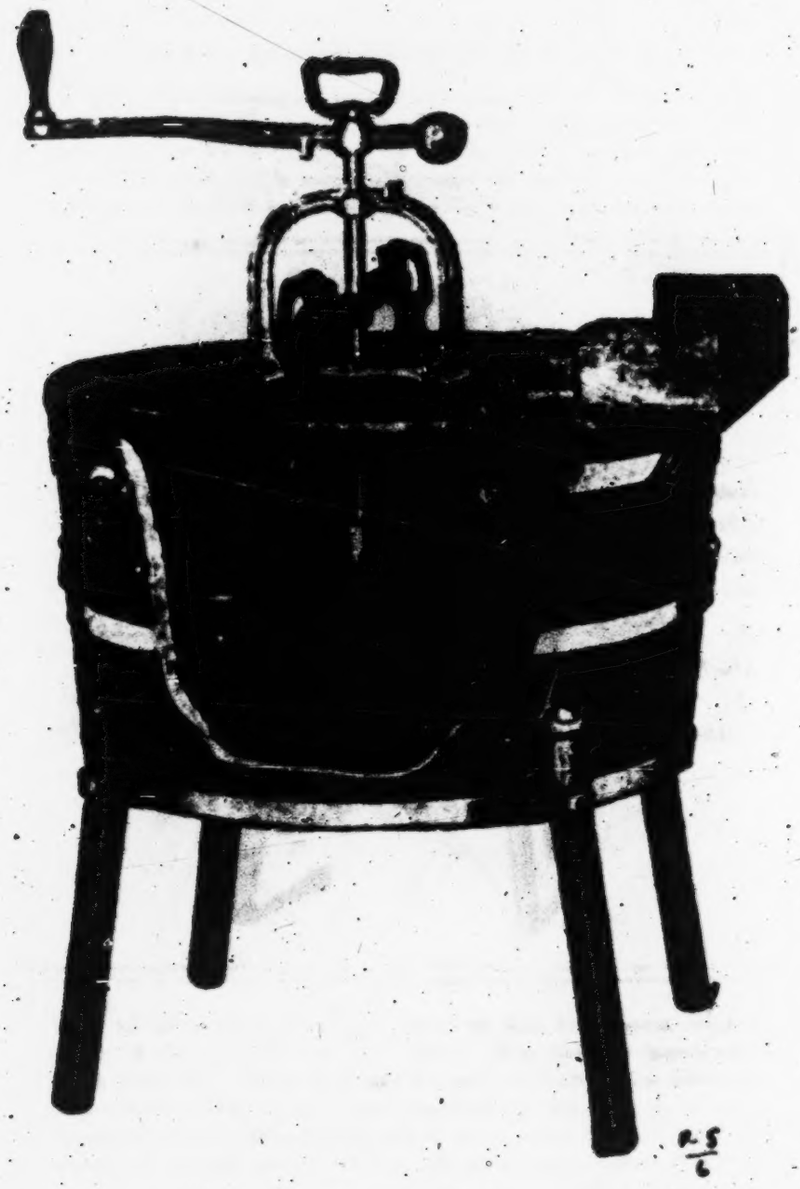
A Machine of Quality!



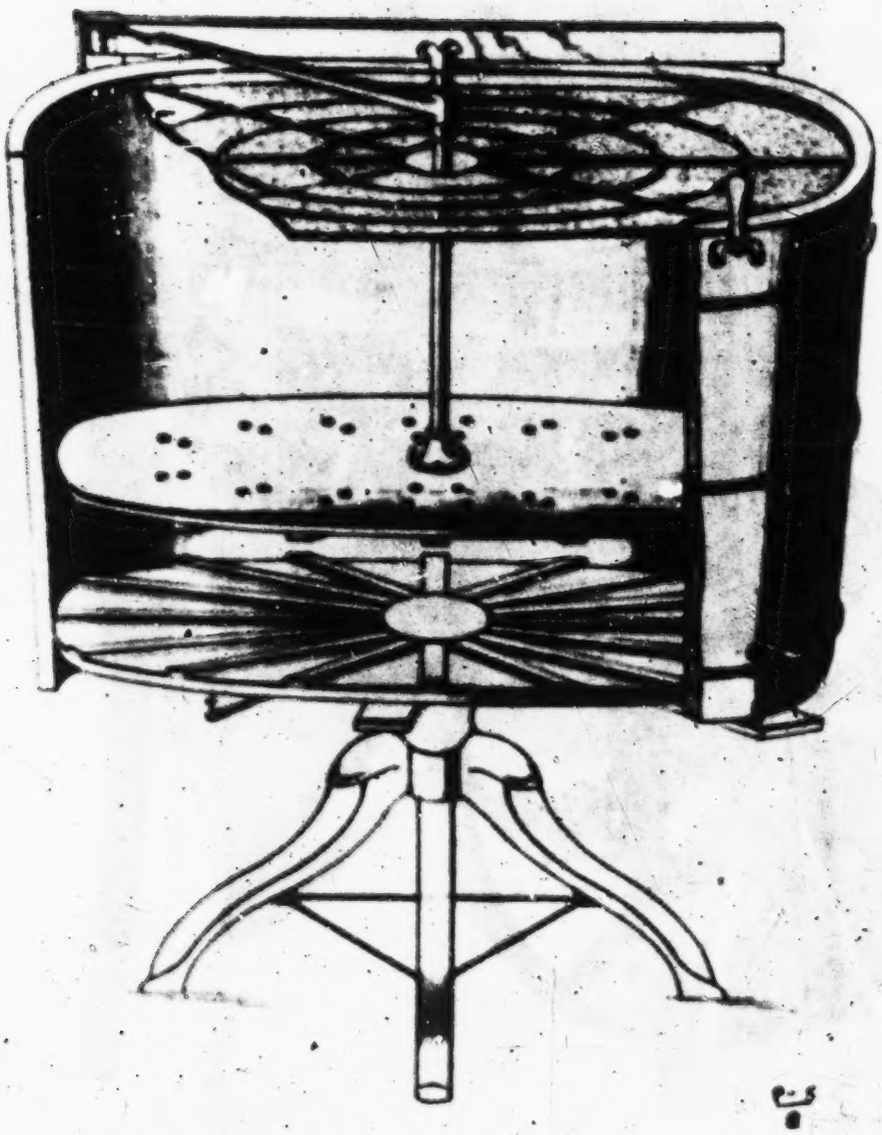
Thousands of Satisfied Users.

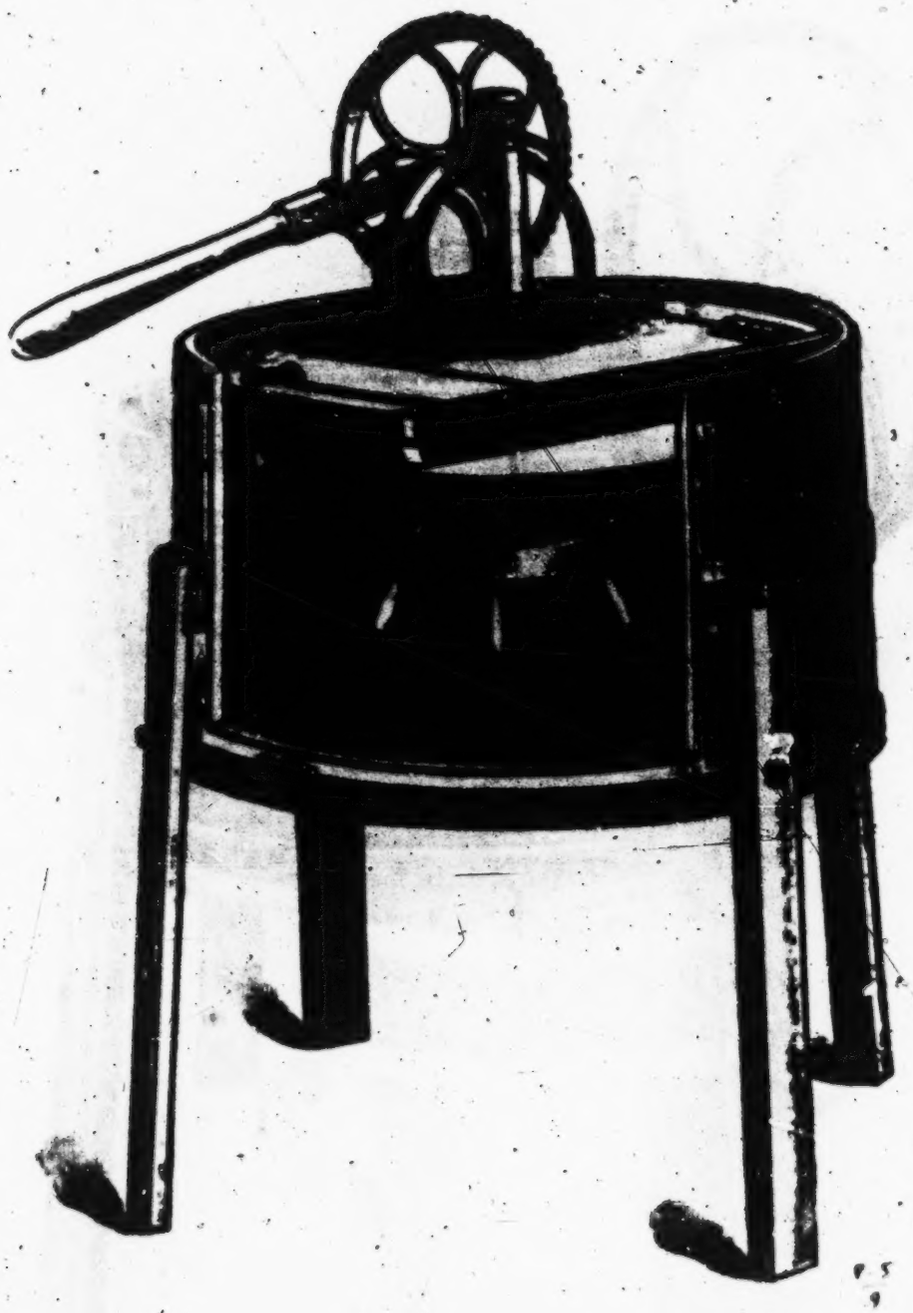
Save your Health, Time, Strength and Clothes

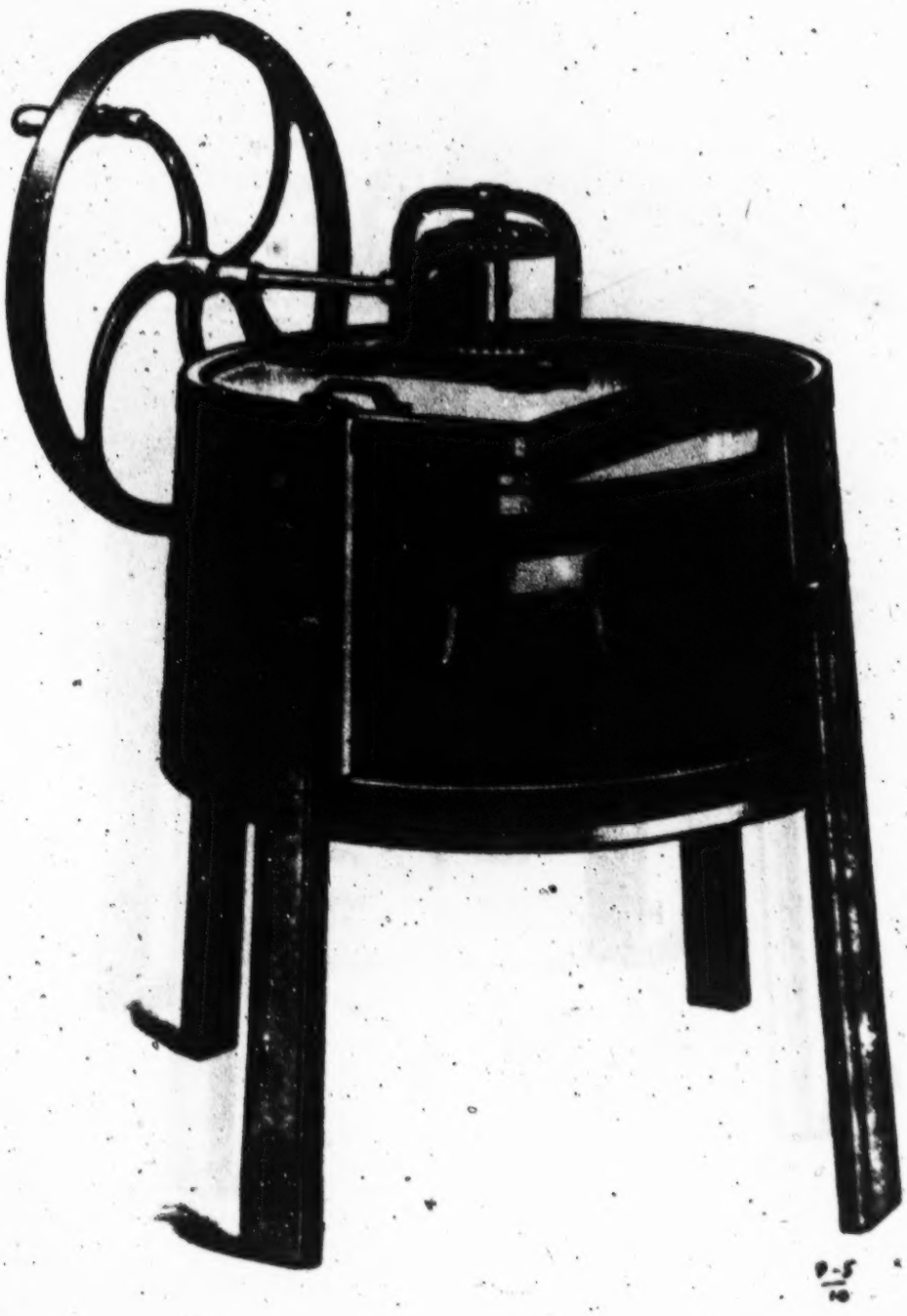
in washer when forced upon the clothes cause a suction, forcing the hot soapy water through the fibers of the clothes. You do not have to pack the clothes around the sides of the Dietz Power Washer to get results. The washer is supposed to do the work and therefore should come in contact with the clothes. The Dietz Power Washers, owing to their different construction, are guaranteed to wash the clothes cleaner, in less time, with less pressure than any other power washer on the market.

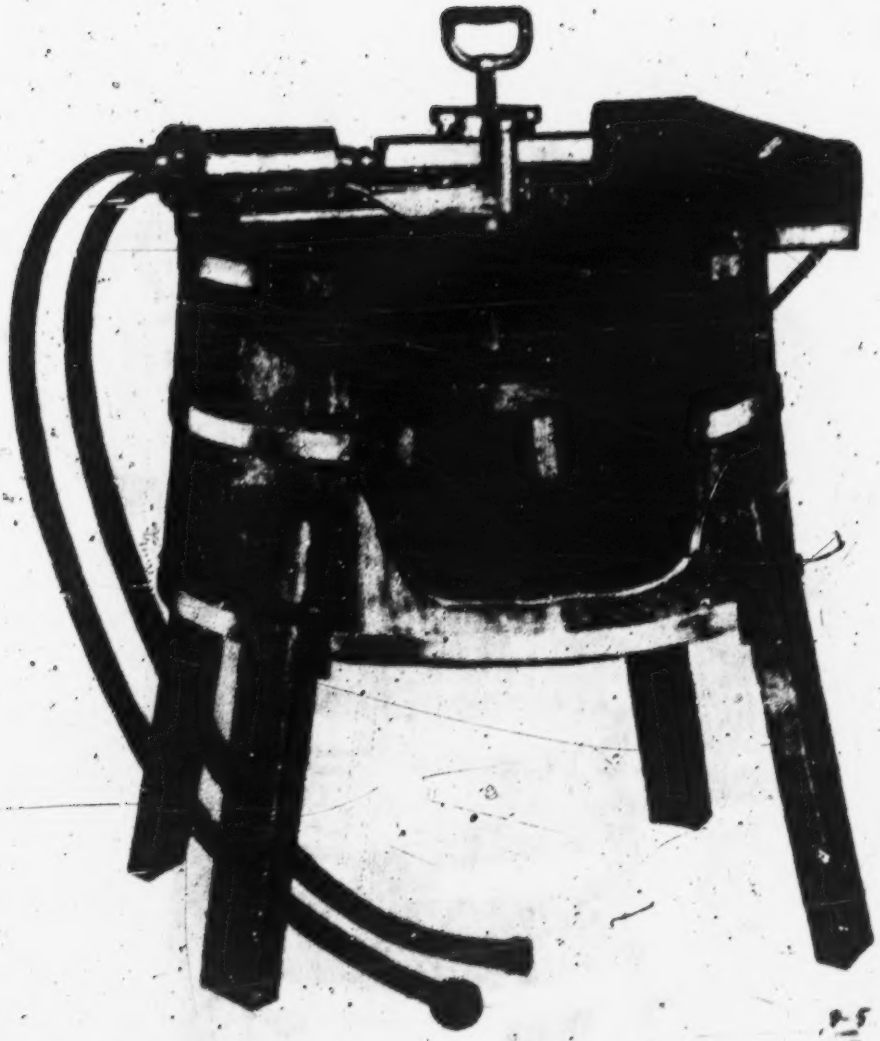


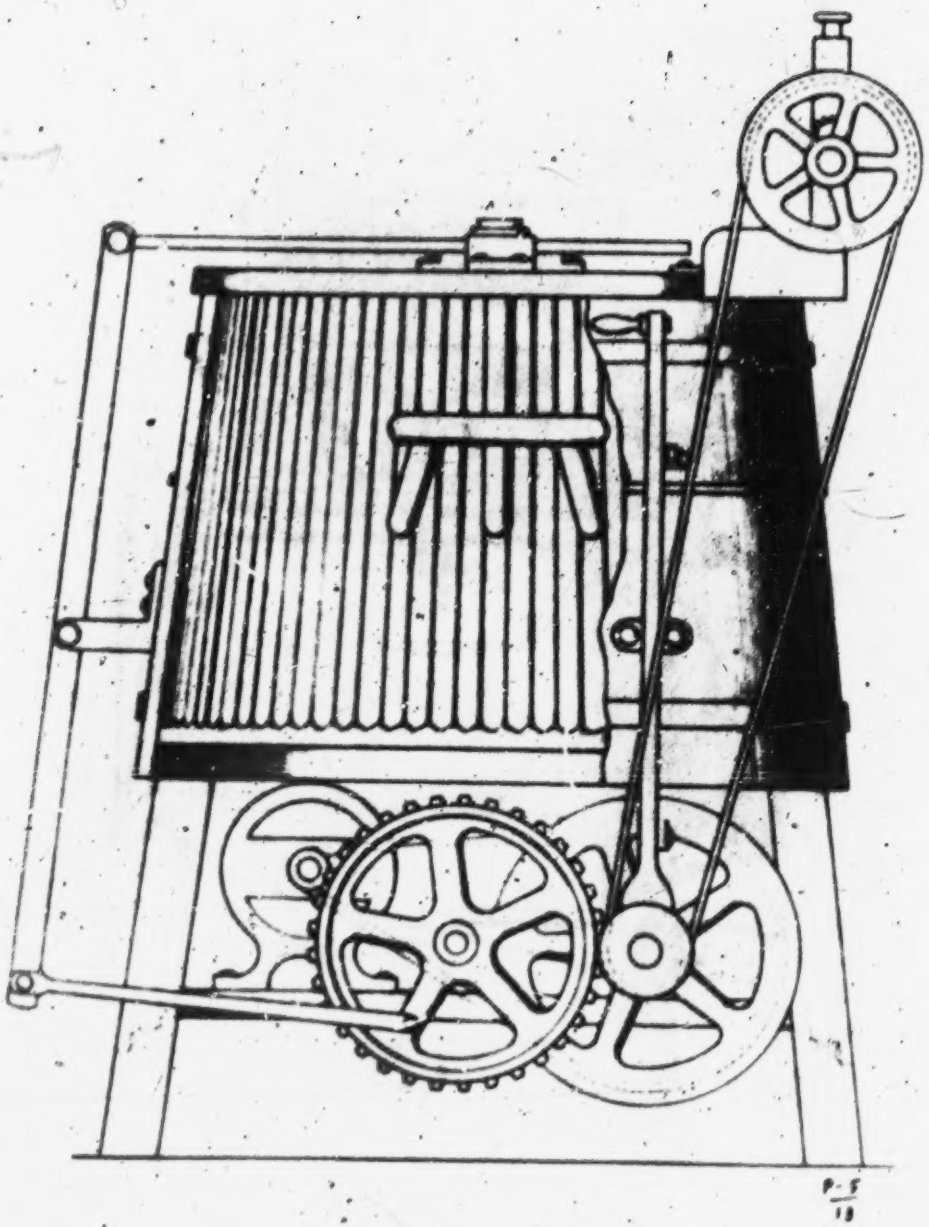
Notice the patent washboard attachment on lid. This is to be used only for parts of clothing soiled more than the average to save operating machine longer than necessary.

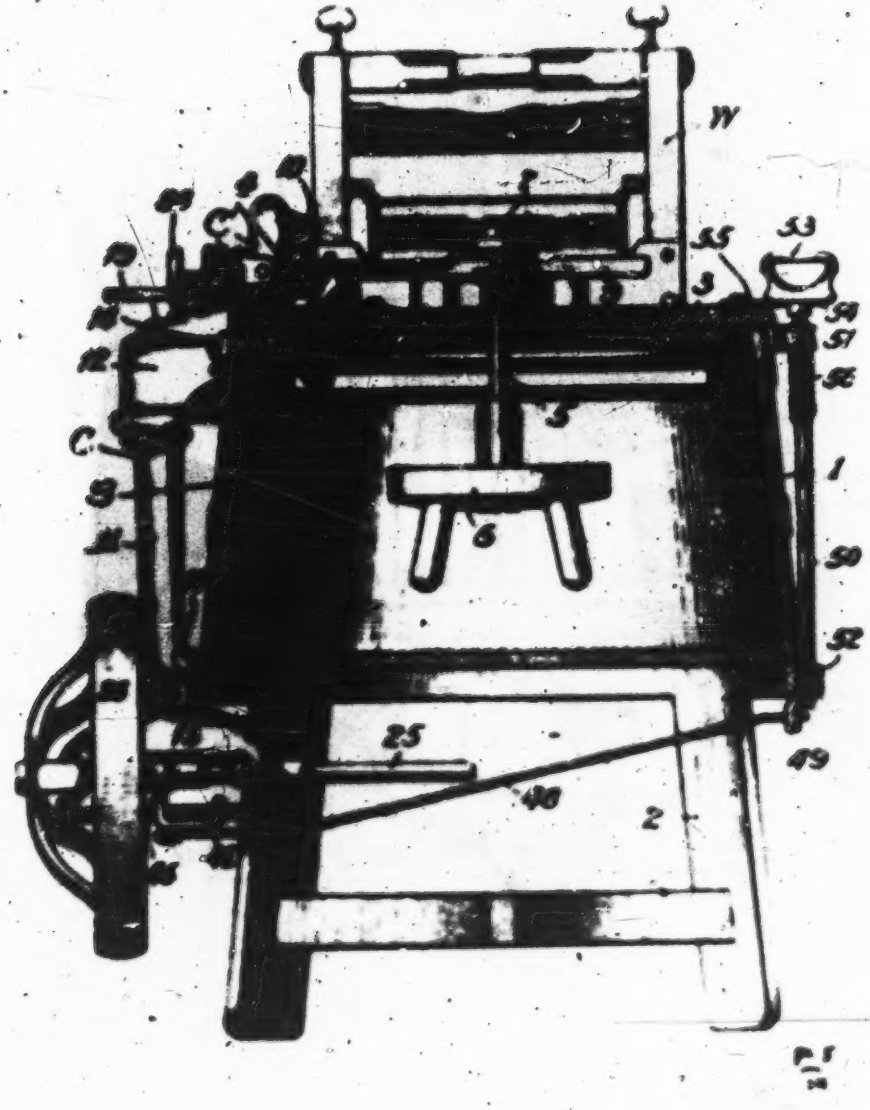








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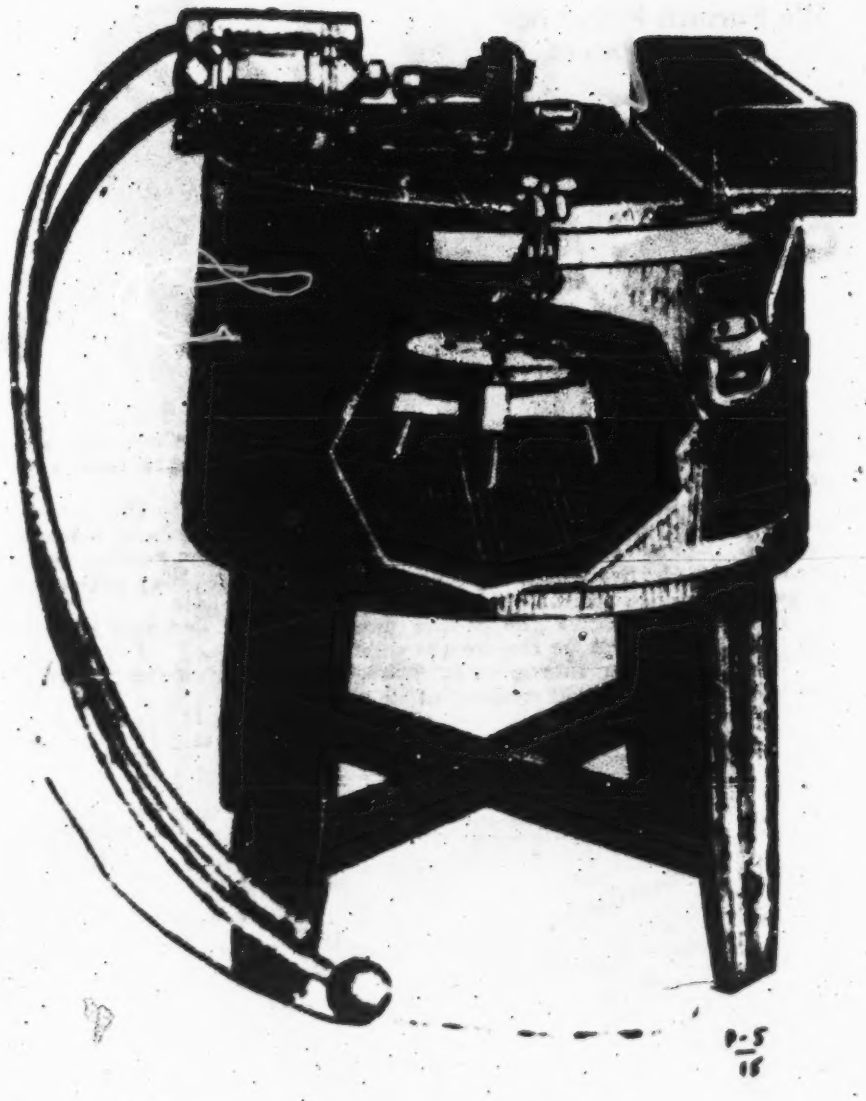
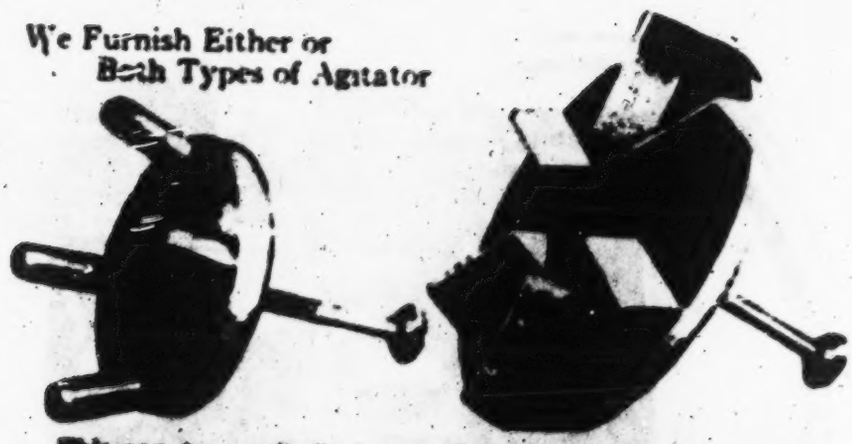


We Furnish Either or
Both Types of Agitator



This new type agitator is one of our latest improvements and has been found equally satisfactory in washing delicate fabrics or heavy clothes.

The rims take hold of the clothes from the center to the outside and rub them against the corrugations on the bottom and sides of the tub. They also serve to force currents of dirt-cutting suds through the clothes which reduces the amount of rubbing necessary to get the clothes clean.

The clothes receive the proper pressure down and out against the tub corrugations by the weight of the agitator.

The Agitator by sliding up or down on the shaft in the center of the tub can wash few or many clothes equally well.

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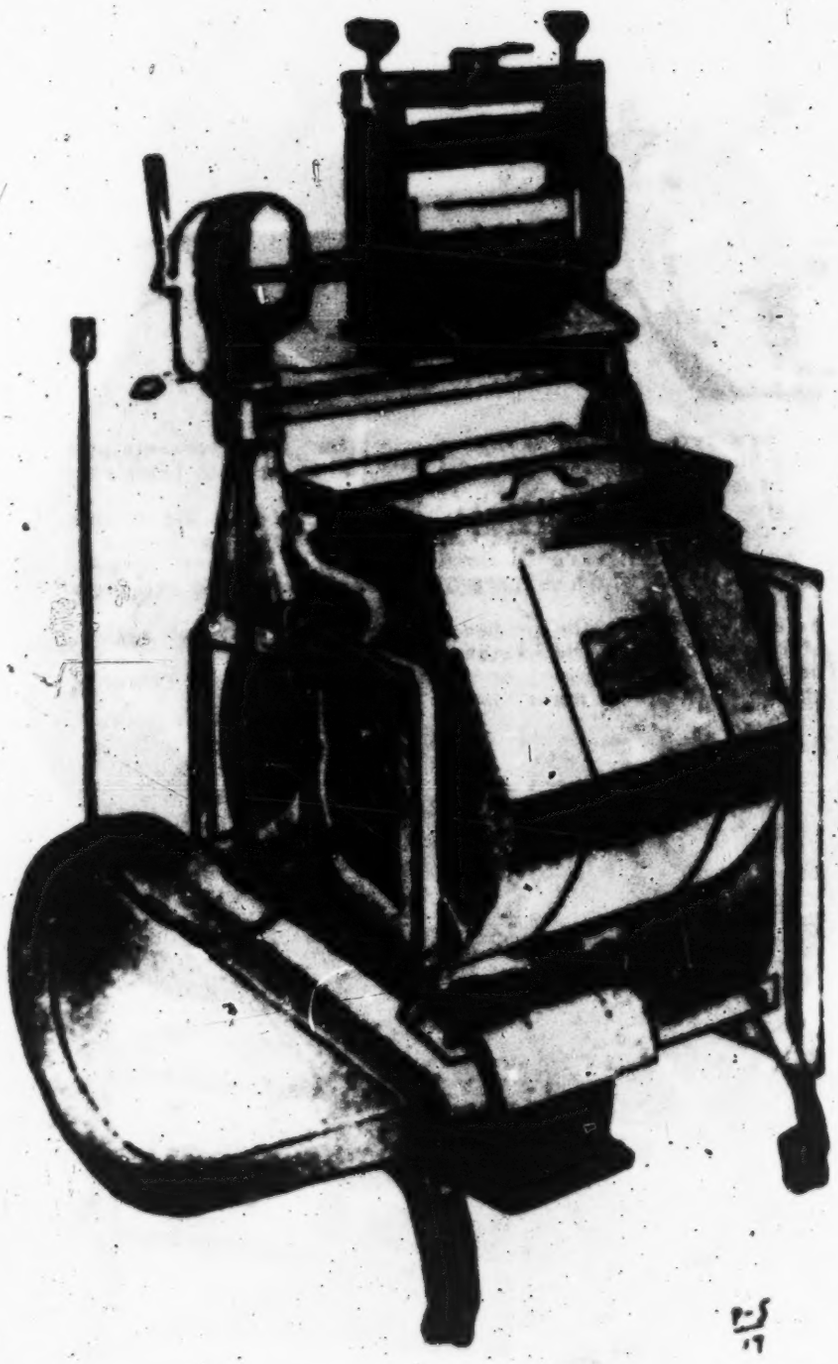

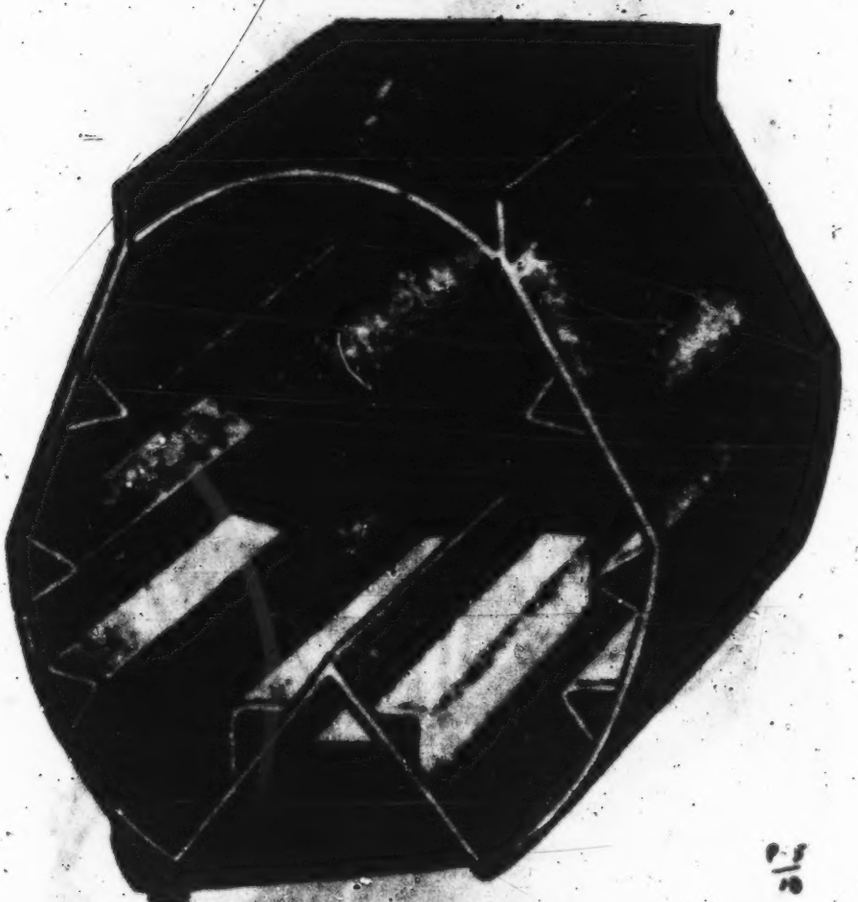

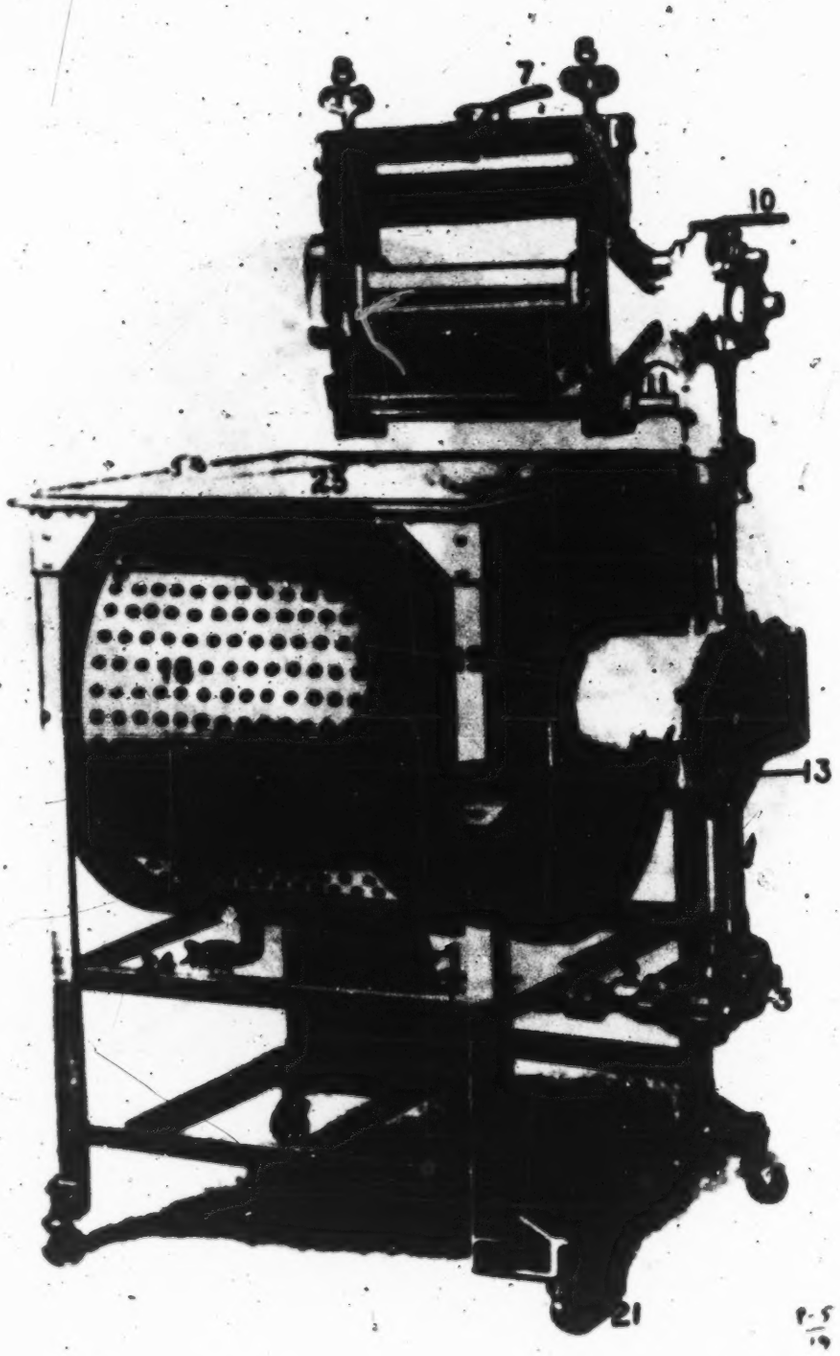
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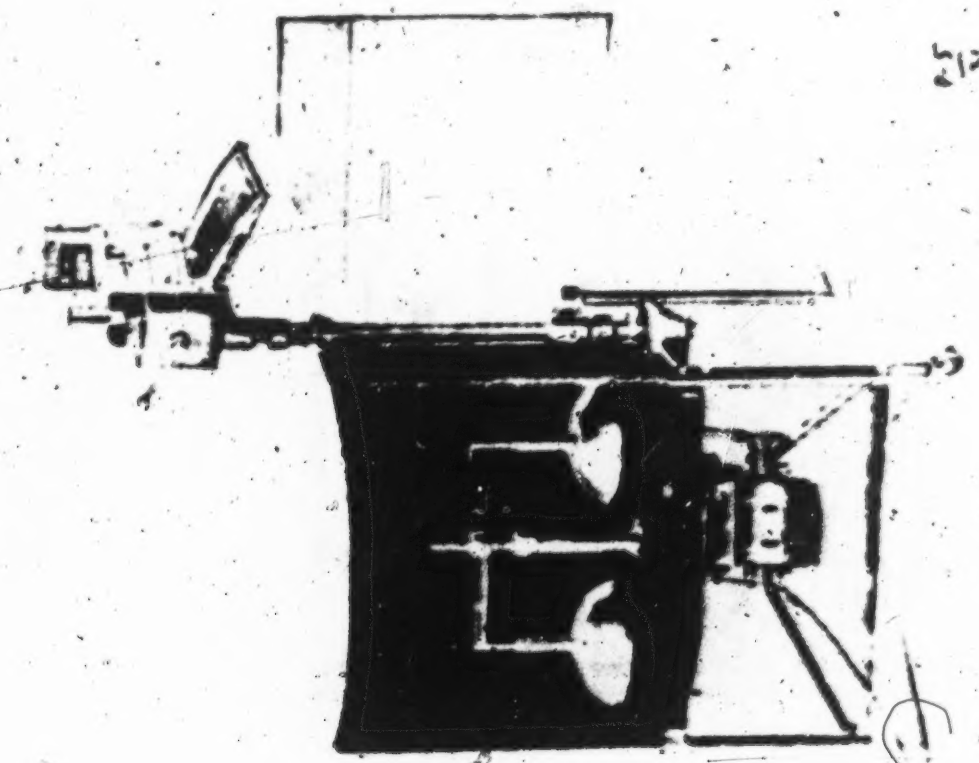

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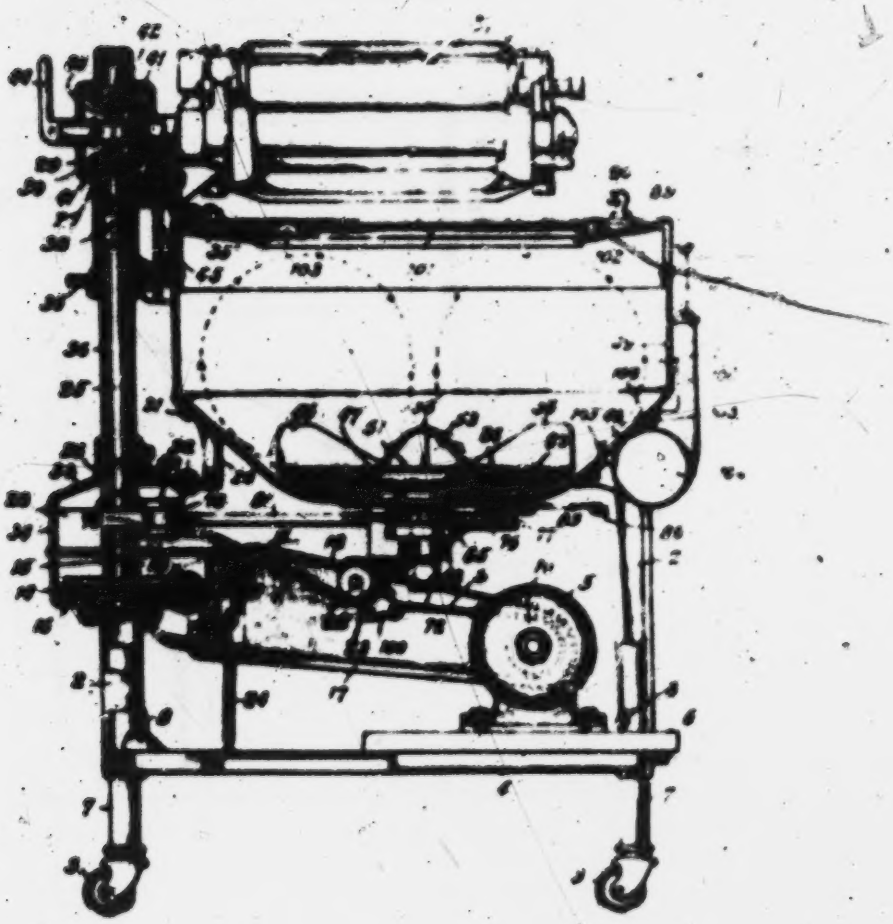
PLAINTIFF'S EXHIBIT No. 9A

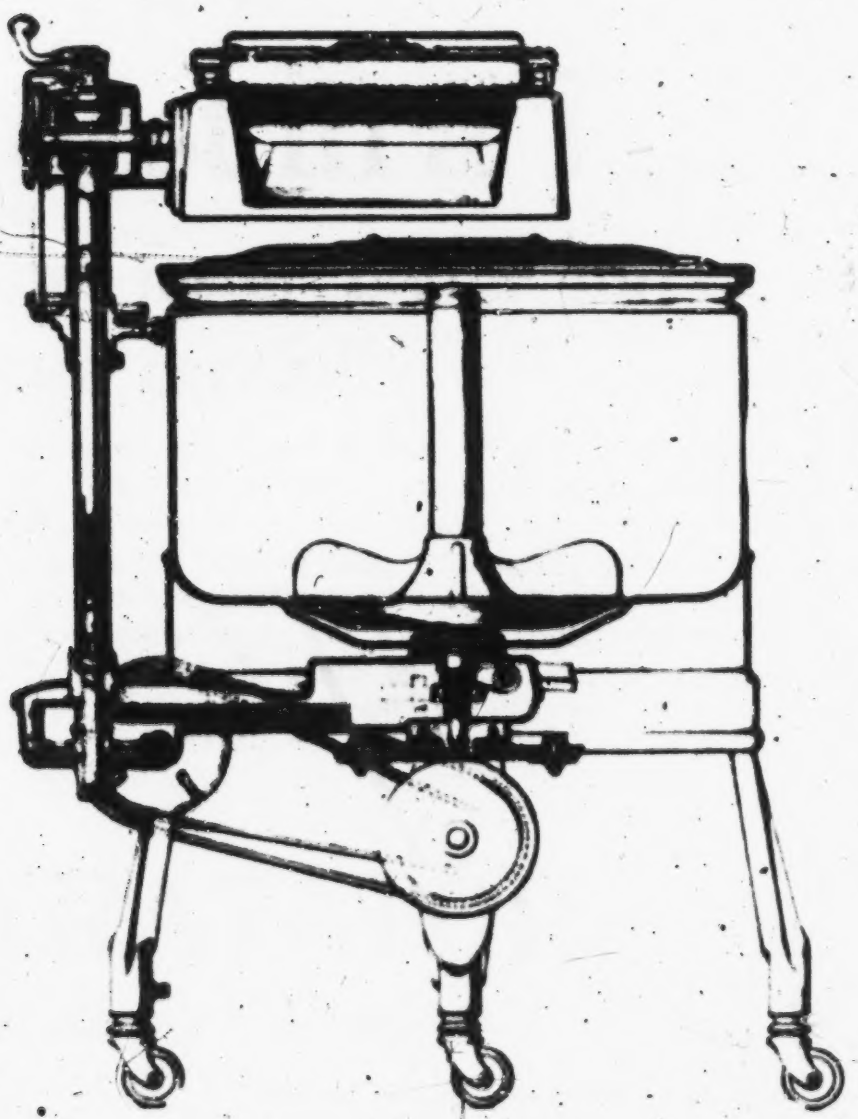
MAYTAG GYRAFOAM
SNYDER PATENTED WASHING MACHINE

FIG. 1. OF SNYDER PATENT NO. 1866779 JULY 12. 1932.
FILED JUNE 14. 1922.



PLAINTIFF'S EXHIBIT No. 11 A

MAYTAG GYRAFOAM
SNYDER
PATENTED WASHING MACHINE
ROUND TUB.



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PLAINTIFF'S EXHIBIT No. 12

Maytag

Perfects New Principle of Clothes Washing!

How "A Tempest in a Tub" cleans clothes faster, better and more carefully

FOR many years washing machines have been in use. They have helped to lighten the work of washday. MAYTAG *Washing Machines* since the earliest days have been in the front rank. None have done better work. Yet we have felt that we had only begun to study the possibilities. For many years we have been experimenting to develop a principle that would wash everything with the thoroughness and carefulness of your own hands, yet with the speed of a machine. The goal has been reached. The idea came as quick as a flash during a series of experiments. The result is a water action that is past description. Words cannot describe it. Pictures cannot half portray it. It is a "*Tempest in a Tub.*" Behind this action is

The GYRATATOR

A Wonderful Invention

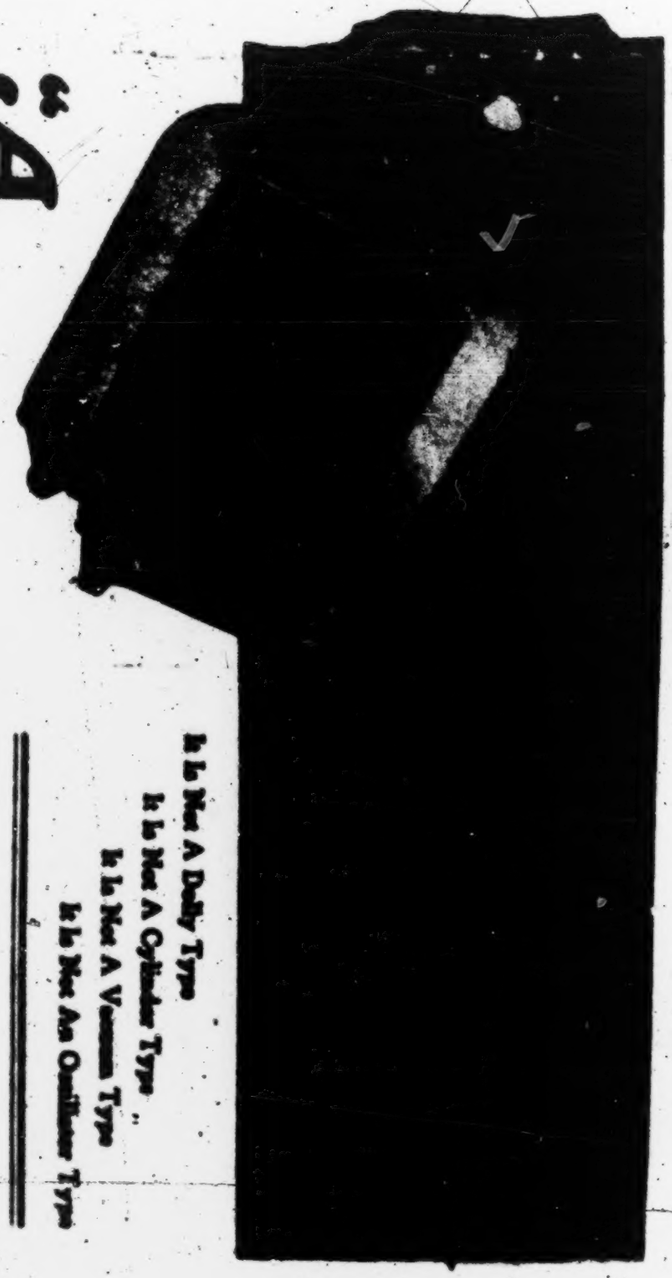
THE *Gyratator* is the device that creates the marvelous action in the water. MAYTAG invented it. No other washer has it, and no other device ever produced such water agitation.

When in action it creates a turbulence in the water that can only be described as "*A Tempest in a Tub.*"

Gyrating currents of water are produced. It looks watery. It sounds like water falling and gurgling and foaming along a rocky shore. Your eyes can SEE that it cleans. Your ears can HEAR that it cleans. Your good judgment tells you that it MUST clean.

Never before has there been such an ideal water action used in washing clothes. It is entirely new. It makes washing by machine easier and better than ever before.

READ INSIDE



Open view showing absence of any obstructions or mechanical parts on the cover of the new

Maytag Gyrafoam Aluminum Washer

"A Tempest in a Tub"

It Is Not A Dolly Type
It Is Not A Cylinder Type
It Is Not A Vacuum Type
It Is Not An Oscillator Type

You must see the wonderful action of the water.

Come in your own way. We have a machine on display.

The Tempestuous Action of the Water Does the Work in the New

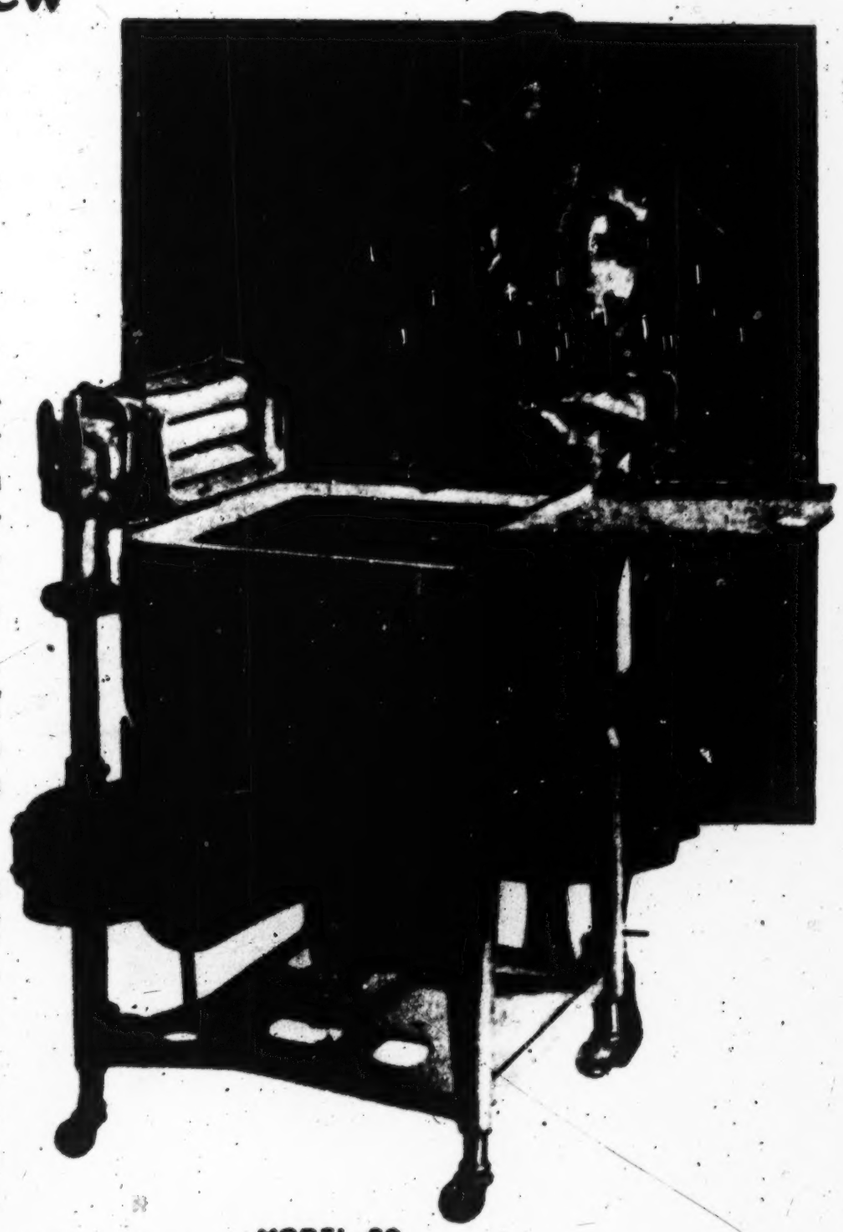
Maytag Gyrafoam ALUMINUM Washer

THIS new machine gets its name from the gyrating currents of water and soapy foam. It is not like any other type of washer. It is not a dolly machine. It is not a cabinet machine. It is not a vacuum or an oscillator machine. It is not like anything ever built. It is the only absolutely new principle of washing in the past ten years.

It cleans as no other principle can. See how it works. Water alone cleans your clothes. The gyrating currents of water gently flex and work the fabrics until the dirt is loosened. Then the turbulent action of the water carries the dirt free of the clothes.

You can clean a tubfull in half the time. If you want to wash a half tubfull of clothes, you use only a half tub of water. If you want to clean just a few pieces you use just enough water to cover them. And the results are remarkable.

It is beyond our power to describe the action of the water, its washing speed, its thoroughness and the care with which it handles even the most delicate things. You must see it yourself. You must lift up the lid while it is working and SEE the action. Then you will understand.



MODEL 80
GYRAFOAM ELECTRIC WASHER

A Cast Aluminum Tub

The tub of the new MAYTAG *Gyrafoam Washer* is made of cast aluminum. It will not rot, rust, corrode, swell, warp or split. It is self-cleaning. It is light, yet has life-time durability.

The shape of the tub makes it easy to work with. There is no machinery exposed. Everything is housed in. The lid is absolutely free of mechanism or obstructions.

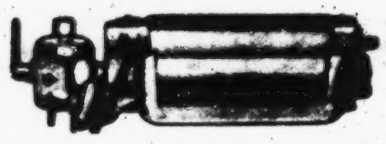
Everyone who has used this new washer says it is the easiest washer to work with they have ever seen.

See a Demonstration— You, Too, Will Marvel!

There is only one way you can realize what a wonderful improvement the new MAYTAG *Gyrafoam Washer* is—YOU MUST SEE IT.

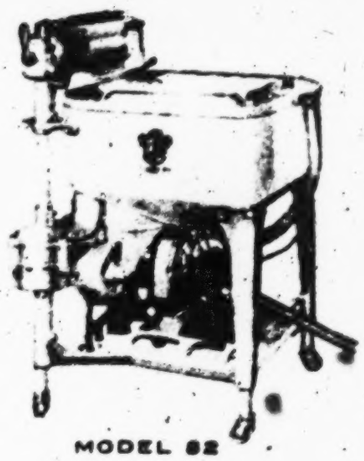
You must see the wonderful action of the water. Nothing like it has ever been seen before. You must hear the gurgling, watery, washing sound.

Come to our store. We have a machine on display. We will demonstrate it for you. See for yourself the action that is astounding women everywhere. Learn why it is called "A Tempest in a Tub."



Famous Maytag All Metal Divided Wringer

Unquestionably the most highly perfected power wringer. All metal except the rollers. Low design, easy to reach over. Wrings backward and forward. Adjustable to five positions. Automatic tilting drain plate. Lightning-quick tension release. An exclusive MAYTAG invention.



MODEL 82

For country homes not having electricity the MAYTAG *Gyrafoam Washer* is equipt with the famous MAYTAG *Multi Motor* which operates on gas or gasoline.

PLAINTIFF'S EXHIBIT No. 13A

2033

MODERN FEATURES AND BUILT-IN QUALITY

make

MAYTAG

the soundest

washer value

NOT just "selling points," but actual, downright quality is built into every Maytag washer. Extra-patronage-treated features . . . refinements and improvements on every small-est hidden part . . . exacting standards of materials and workmanship . . . rigid inspections of every part and assembly . . . these all go together to put the Maytag ahead in a class by itself. And they account for the fact that Maytag is known for highest quality in practically every country in the world.

Cushioned power . . . Extra heavy crankshaft and bearings . . . Long stroke, slow speed . . . Another reason for super quality of Maytag washers . . . Gasoline engine completely de-veloped and manufactured by Maytag.

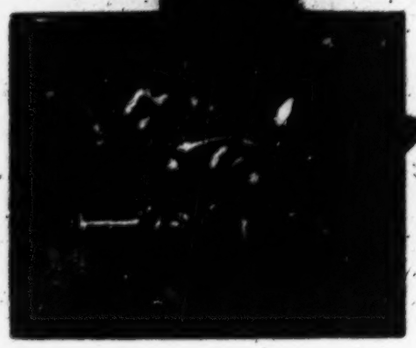
Gyrofoam tub . . . Only Maytag has this marvelous washing action . . . Gentle as hand rubbing . . . Thorough as human energy can make it . . . Cleans clothes in less time . . . Saves clothes . . . Saves soap . . . Saves hands . . . Saves work . . . Saves money.

Ringer control . . . Ringer can be turned to any position . . . Ringer rolls can be removed instantly for cleaning . . . Ringer pressure can be released instantly . . . Ringer pressure can be set instantly for any thickness of clothes . . . Ringer pressure can be increased instantly for heavy pieces.

Motor, rubber mounted to eliminate vibration and noise . . .

Famous Maytag Gyrofoam . . . the Maytag agitator . . . moves like human hands . . . thoroughly washes clothes by force . . . forces soapy water through clothes . . . loosens dirt . . . carries it away . . . and does more thorough washing . . . than any other method of washing.

Gyrofoam washes clothes as they would be washed by hand . . . Gentle . . . Thorough . . . Quick . . . Easy on clothes . . . Easy on hands . . . Easy on the pocketbook.



MAYTAG was the first manufacturer to make an engine-powered washer. More than half a million of them have been bought for use in homes where electric current is not available.

The Maytag Multi-Motor is very simple in design, with but four moving parts . . . is easy to start, with foot lever starter . . . has bronze bearings for long life and freedom from trouble . . . easily adjusted carburetor which cannot be flooded . . . comes equipped with Bosch Magneto: no storage battery necessary.

Any Maytag may now be had equipped with Multi-Motor at slight additional cost.

WORDS—even pictures—fail to give you the story of Maytag quality. You must see the Maytag in action! realize what it will do for you!

Let us demonstrate a Maytag for you without any cost or obligation on your part.

●

THE MAYTAG COMPANY

MANUFACTURERS

NEWTON, IOWA

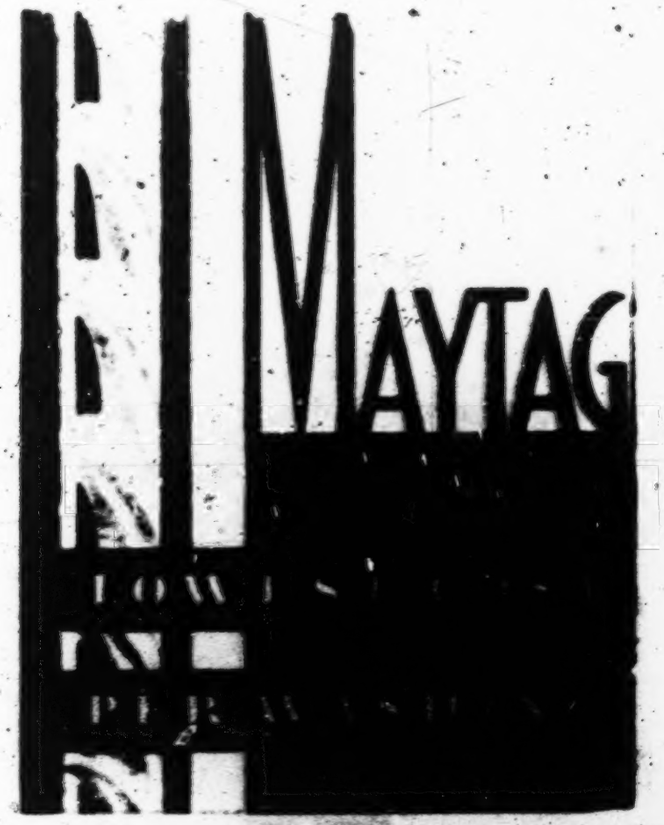
Founded 1893

The Maytag Co., Ltd., Winnipeg, Canada

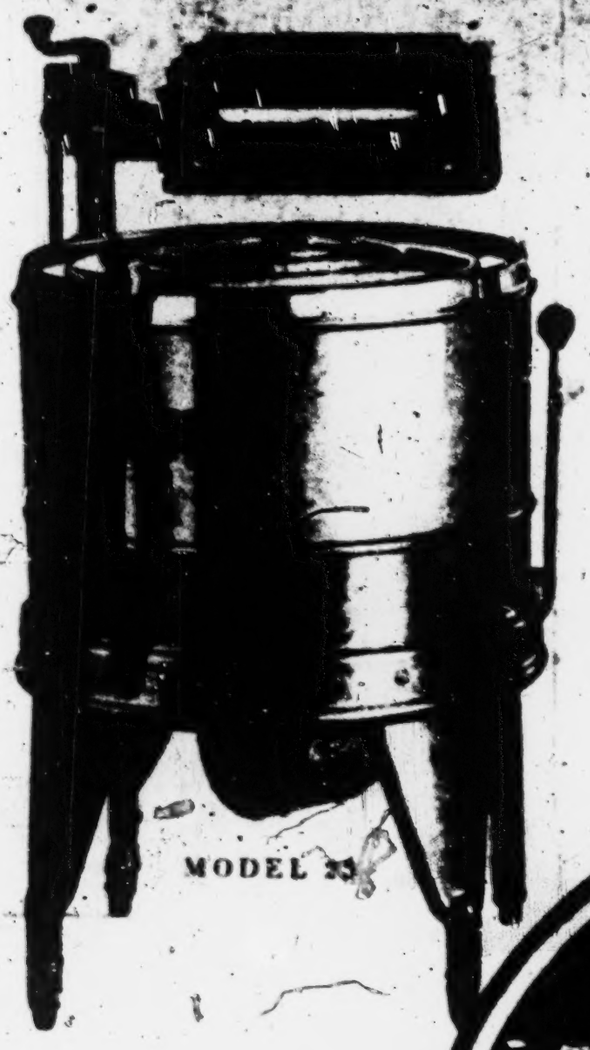
Plaintiff's Exhibit,
Plaintiff's 1932
Circular

Aug. 13

Form No. 333 Printed in U. S. A.



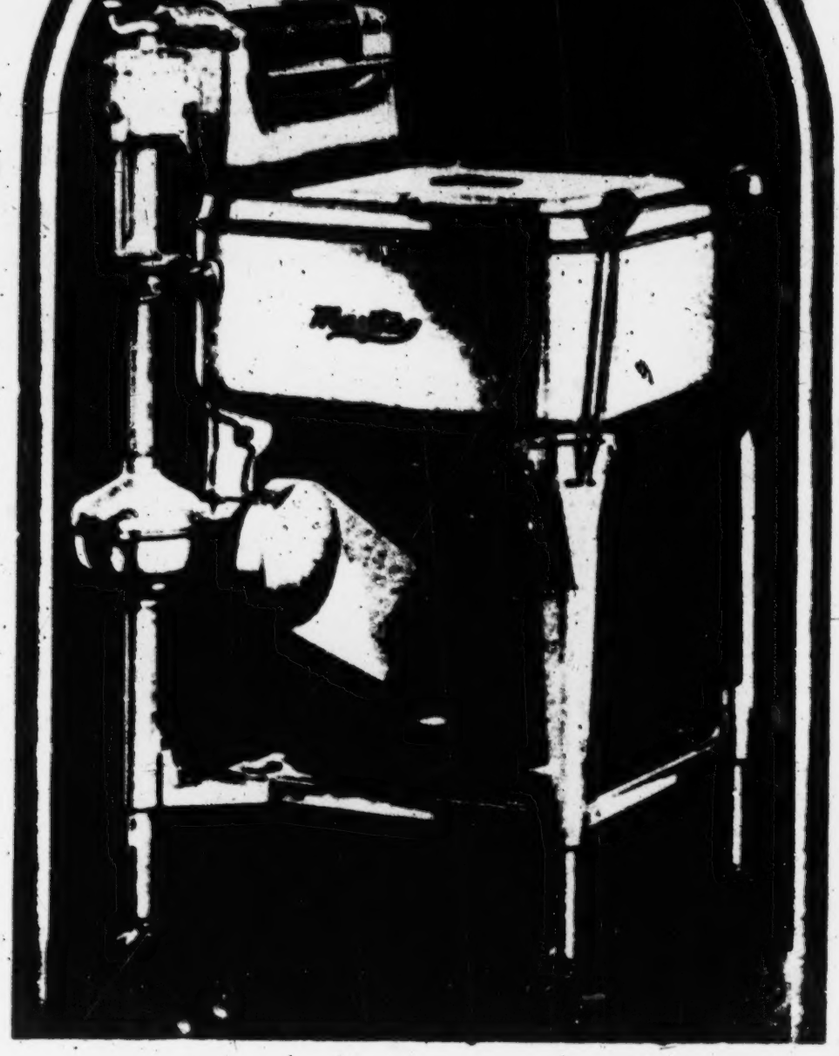
MAYTAG QUALITY — *Whatever Price You Pay*



MODEL 25

MODEL A—the washer that brought world leadership to Maytag. And not even Maytag has ever built a finer washer. The tub (four gallons oversize) is cast in one piece from *aluminum*—lifetime aluminum, the *best* material known for a washer tub. The Roller Water Remover with its firm and soft rolls, its safety feed, reversible drain and many other exclusive features of superiority cannot be duplicated on *any other* washer made. Yet that is but *one* of the reasons why the Model A is known as the World's Finest Washer. You have only to see this Maytag to realize its superiority.

MODEL 15



MODEL 25—cast aluminum tub Maytag washer. Maytag is the first and only manufacturer to build a washer with one piece cast aluminum tub. Here's the lowest priced one ever built.

And every part of this Model 25 is worthy of the cast aluminum tub. Every moving part is hardened and heat treated for extra wear. The removal of water is accomplished by a wringer that has two soft rolls. The wringer is designed for perfect safety . . . is sturdier, longer lasting, more efficient, easier to operate, and more dependable than you'd expect to find on a washer at this price or *any other price*.

MODEL 15—the lowest priced washer ever built to Maytag quality standards. Tub of Platinum Gray Porcelain-on-steel, the same material as the most expensive washers of other makes. Automobile type shift lever to start and stop washing action while motor is running. Wringer control with one lever to start, stop, reverse or swing the wringer. Many other quality features.

Don't let the low price of this washer confuse you as to its quality. It's a high grade washer in every respect—built the Maytag way, with quality you can *see* and *extra* quality in the parts you can't see—unquestionably a superlative value for the price.

Page Tightly Bound

PLAINTIFF'S EXHIBIT No. 17 205

Special Features of the New Thor 32

ALL METAL BODY. Extremely strong and durable.

LARGE CAPACITY. The No. 32 will accommodate 10 sheets or their equivalent at one time, although it is comparatively small in size.

5 POSITION, ALL-METAL SWINGING REVERSIBLE WRINGER. The safest, most substantial and convenient wringer built. An exclusive Thor feature.

DIRECT DRIVE; ALL MOVING PARTS ENCLOSED. No belts, chains or pulleys. Absolutely safe and trouble-proof.

THE REVOLVING REVERSING CYLINDER PRINCIPLE of washing—the safest, most reliable and efficient way to wash clothes.

In addition, the new Thor No. 32 contains every desirable feature to insure convenience and comfort, together with the most reliable and durable construction.

Ask About Our Easy Payment Plan

MADE AND GUARANTEED BY

Let Your Thor Pay for Itself as You Use It

THE Thor SHOP

S. S. ELECTRIC CORRIGAN.

24 East Jackson Blvd. Between State and Wabash Harrison 7904

Form 30-1

The Thor No. 32 Electric Washer

The new Thor No. 32 Electric Washing Machine is particularly intended to meet the exacting requirements of those who want the best of everything they buy.

It is the most substantial, practical and efficient electric washing machine. Its graceful lines suggest its superiority and mechanical perfection. It contains every worth-while feature for convenience and reliability combined with the most improved method of washing.

This wonderful new home labor saver is the result of 14 years' experience and uninterrupted progress in manufacture by the oldest and largest concern of its kind in the world. All the resources and ingenuity of this great organization have united to produce this perfect washing machine — the Thor No. 32. Its performance and absolute satisfaction are guaranteed.

The Thor "32" will wash everything from the finest laces to the heaviest blankets easily, quickly and thoroughly. It is simple, safe and easy to use. It will do a large washing in an hour at a cost of two cents for electricity.

You must see the Thor No. 32 to fully appreciate its superiority.

WE WILL BE PROUD TO GIVE YOU A COMPLETE DEMONSTRATION.

707

PLAINTIFF'S EXHIBIT No. 18

More Time For You

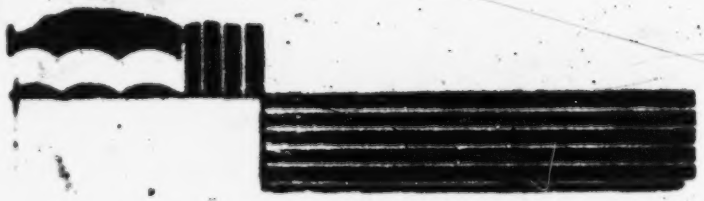
The THOR Agitator has been designed to afford a speedy cleansing of clothes with the most gentle washing action. Thousands of housewives testify to its efficiency.

HURLEY MACHINE COMPANY
CHICAGO

18

THOR ELECTRIC SHOP

202-204 South Wabash Ave.,
Chicago . Illinois
PHONE WABASH 7948-47



Page Tightly Bound

when a THOR AGITATOR WASHER does the work

$98

Imagine! A full week's washing done—ready for the line in less than two short hours. Think what that can mean to you in time saved for leisure . . . rest . . . enjoyment of life.

And in those two hours—none of the drudgery common to old washday methods. The *Thor* Agitator Washer—greatest of all speed-washing achievements—does *all* the work.

Five minutes a tub!! Clothes sweet and clean. Made so by the fast, gentle action of its remarkable Agitator. By actual test this washer thoroughly cleanses shirt cuffs and collars in one washing without soaking.

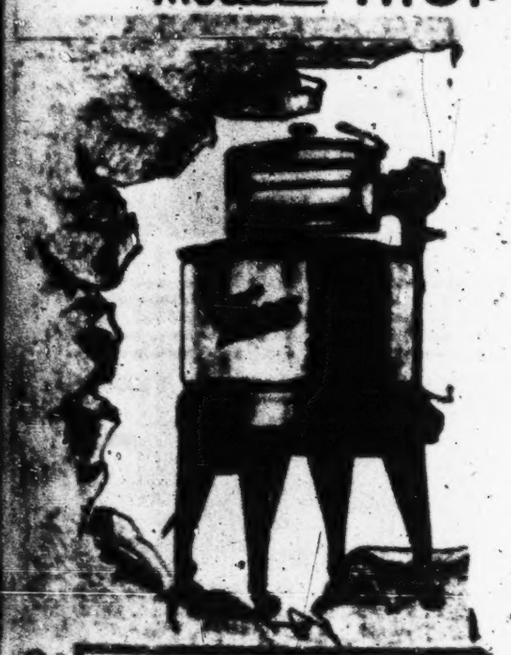
Look at its glistening ripple green vitreous enamel tub. Its streamline beauty. Its compact size—yet generous capacity. Examine it. See it work. And you will know why hundreds of thousands of women have selected it in preference to *all* other washers *at any price.*

Have a demonstration before you buy any washer of any make.

PLAINTIFF'S EXHIBIT No. 19

209

This New ECONOMY Model THOR



Never before—a value like this. A brand new quality Thor Agitator Washer with high price features from "stem to stem." See this Thor before you buy any washer at any price.

$49.50

Thor

You'll find the same quality in this Economy Model Thor that has made all Thors famous for long time service and satisfaction. Why consider inferior or unknown makes when a Thor costs so little?

Washing the clothes [illegible] your wash day job. This late model Lovell Porcelain Cleaner assures efficient, uniform water circulation through the clothes in one position.

The tub is made of solid drawn iron and is covered with [illegible] enamel. Rustproof, corrosion-proof and is easy to clean as a china dish. Lasts a lifetime.

The Thor Agitator produces a speedy yet gentle water action which washes clothes through sudsy water. A load of clothes is washed spotlessly clean in 5 to 7 minutes

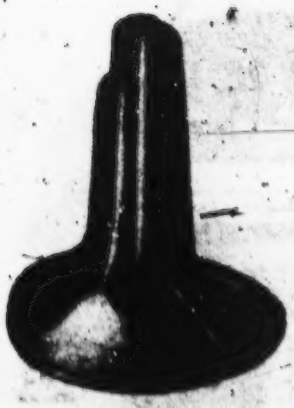
Mfd. By HURLEY MACHINE CO., Chicago
Established 1906

PL Ex 55

FORM NO. [illegible]

[illegible] PRINTED IN U. S. A.

PLAINTIFF'S EXHIBIT No. 20 710



Pl Exh 6

from
LACES
to
BLANKETS

Here is the new THOR Super-Agitator which gives amazing results—evolved after hundreds of experiments by THOR engineers. This Super-Agitator prevents clothes from tangling, produces a new washing action which washes clothes faster and more effectively. Be sure to see it before you buy any washer.

HURLEY MACHINE COMPANY
CHICAGO

FOR

Printed in U.S.A.

Page Tightly Bound

with the same GENTLE ACTION

An entire week's washing may be completed in two hours or less with the THOR Super-Agitator Washer. Spotlessly clean clothes—from the sheerest finery to the heaviest blanket—all safely cleansed by a gentle washing action that safeguards the most delicate fabric.

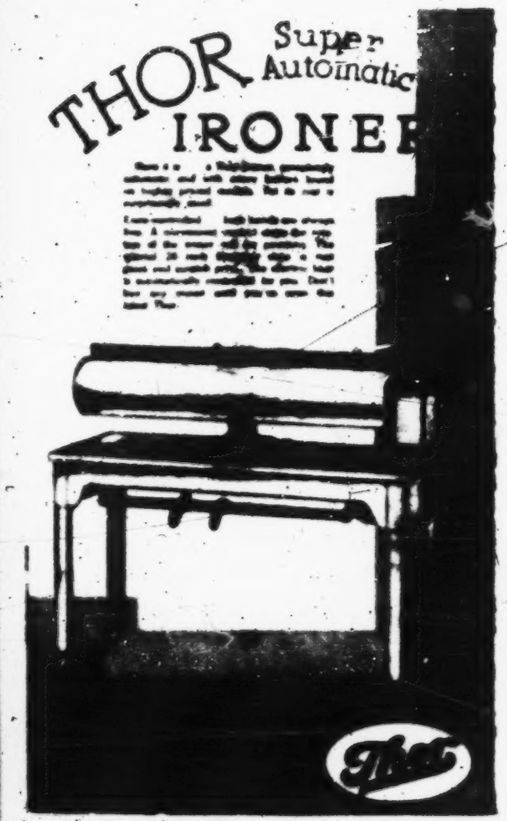
You will find features in this THOR Washer to be found in no other washer. There is a built-in electric heater that keeps the water piping hot during the entire washing. A super-agitator that offers a faster washing action without any possibility of tangling clothes. Wringer hand rails lay ease of feeding clothes through the wringer. It is noiseless due to the rubber mounting of the motor and has rubber-tired casters to dampen all vibration and make the washer easy to move. And an extra large washing capacity—six sheets.

Economically, it is a boon to any family budget. Its initial cost is surprisingly low, its cost of operation is negligible.

Thor

712

PLAINTIFF'S EXHIBIT No. 21



THOR

FOR MORE THAN 25 YEARS THE GREATEST NAME IN HOUSEHOLD APPLIANCES

OVER TWENTY FIVE YEARS AGO Thor built the first electric washing machine. Through all these years, the genius of the originator has kept this famous name in the foremost ranks of washing machine design and excellence.

Year after year—in this progress of more than a quarter century—the great Thor laboratories have never once relinquished the right of this name to leadership.

The great improvements in design have been Thor's. The great time and labor saving achievements have been Thor's. The world records for long life and year-in-and-year-out performance belong to Thor.

Other washers have come and gone. There will be more. But the priceless experience of over 25 years of constant development will continue to be the greatest reason why you should own a Thor. This same invaluable experience has enabled Thor to dominate the power field and to offer housewives the most efficient and economical means of ironing.

Thus—when you buy a Thor—you do so with the assurance that you are buying the finest money can buy. That its quality will never disappoint you. That its price is the lowest price at which a quality appliance can be built. And, most important, that back of that appliance is a guarantee of satisfaction from Thor—for over 25 years the greatest name in household appliances.

•

HURLEY MACHINE COMPANY—CHICAGO

1 87

Thor

WASHERS • IRONERS

A Thor for Every Purse and Purpose

PLAINTIFF'S EXHIBIT No. 22

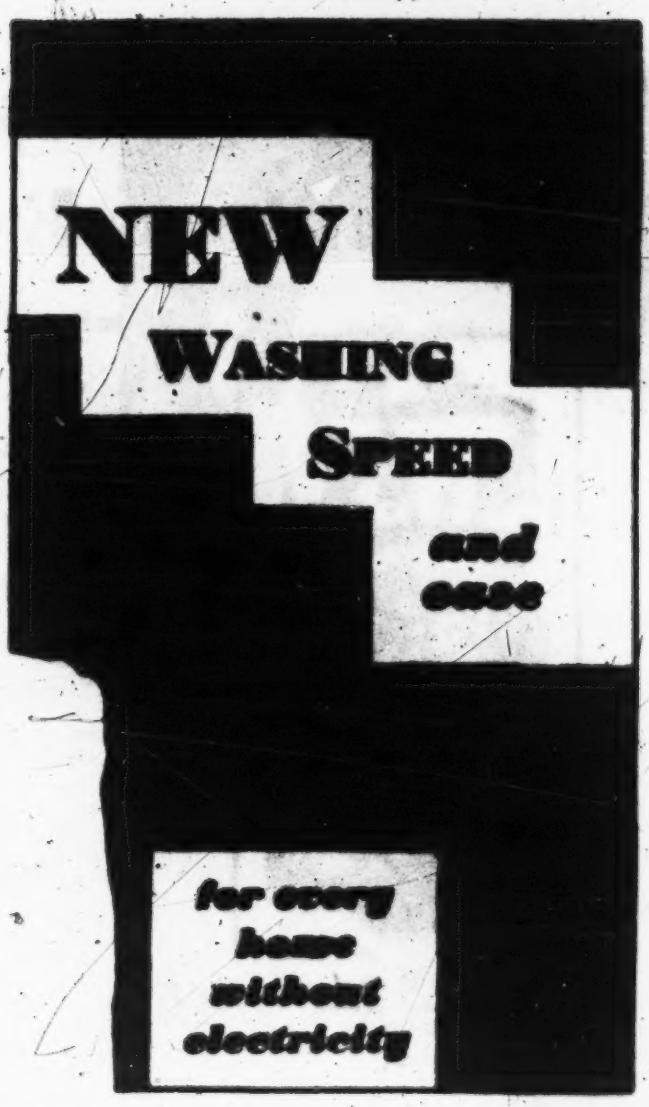
713

GUARANTEED

Gas Engine for Trouble-Free Service

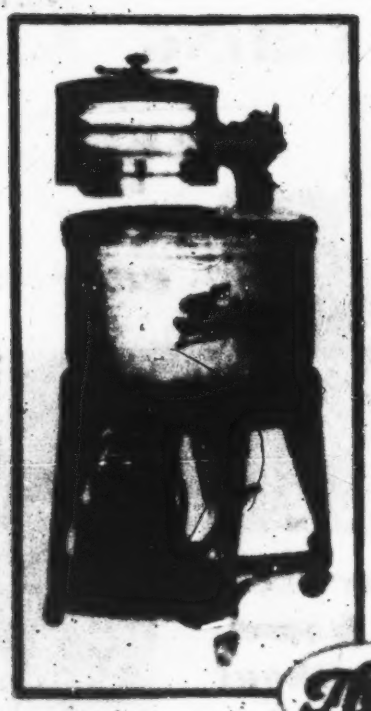
NOTHING but the best could be offered with the famous Thor Agitator. Every part is precision made. 4-cycle design assures easy starting—full power—thorough lubrication. Tested by Thor's own engineers—it is recommended as a worthy companion to the faithful Thor Washer.

DOELLE MACHINE COMPANY-CHICAGO, ILL.



Finest, Fastest Thor Washer Ever Built

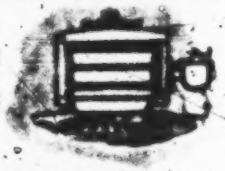
Equipped with 4-cycle Gasoline Engine



THE Thor Agitator Washer is equipped with a 4-cycle engine, guaranteed to give trouble-free service. This engine assures easy starting, full power and thorough lubrication.

THE Agitator produces a remarkably fast washing action. A load of clothes is washed spotlessly clean in less than five minutes.

THE pressure cleanser has "balloon" rolls, which press out all the loosened dirt as your garments are fed through them.



THE tub is made of Armco iron, drawn cold, with a thick, durable covering of baked-on vitreous enamel. Rust proof and non-corrosive. As easy to clean as a china dish.

Thor

See the Gasoline Engine-driven Thor Agitator Washer. Ask for a demonstration in your own home. Your Thor dealer has an attractive payment plan for your convenience. Call on him today.

PLAINTIFF'S EXHIBIT No. 23

715

WHY
WOMEN PREFER THE THOR AGITATOR WASHER

1 Life-Time Tub. Oven baked Porcelain Enamel inside and out.

2 Beauty. In accordance with modern ideas of style and color.

3 Wide Top Tub. Easy to put clothes in—easy to take them out.

4 Rubber-Guarded, Vibration-Proof Lid. No Rattles.

5 New Speed. New kindness to clothes.

6 Simple, Compact, Easy to Operate. General Electric Motor.

7 Big Capacity. Amply large for the average family.

HURLEY MACHINE COMPANY · CHICAGO, ILL.

P Ex 84

Gas heated

Thor

AGITATOR WASHER

Keeps Water Hot all through the washing

HOT WATER WASHES CLOTHES FASTER

GOES IN AFTER DIRT . . . SHORTENS THE WASHDAY JOB

THE Agitator produces a remarkably fast washing action. A load of clothes is washed spotlessly clean in less than five minutes.

THE built-in gas heater affords piping hot water throughout the entire washing. Constantly heated means a faster, cleaner washing action.

See the Gas-Heated Thor Agitator Washer. Ask for a demonstration. Your Thor dealer offers an attractive payment plan. Call on him today.

THE tub is made of Armco drawn cold iron, with a thick, durable covering of baked on vitreous enamel.

Rust-proof and non-corrosive. As easy to clean as a china dish.

THE pressure cleaner has "balloon" rolls which press out the loosened dirt as your garments are fed through them.

PLAINTIFF'S EXHIBIT No. 24

717

Let ECONOMY be your WASH WORD

This Thor combines speed, beauty and economy. It has, as an exclusive Thor feature, The Super-Agitator which produces 930 water currents per minute. Those who are looking for outstanding quality at a surprisingly low price should see this Thor in action.

for
FAMILY WASHING
"There's no place like Home"

Quality From "Stem to Stern"

The Thor Washer is equipped with the latest model Chamberlain Wringer. It assures uniform water extraction. It is easy and safe to operate. Don't overlook the importance of the wringer — for it relieves a 50% of your washing job.

The Thor Super Agitator is the result of many months testing and experimenting. It produces and uses different currents of water which afford the fastest, gentlest washing action ever designed. Clothes are washed spotlessly clean in from three to five minutes. No need to give special attention to collars and cuffs in the Thor. They'll be snow white, too.

The tub is made of solid drawn iron with a thick, durable covering of baked on porcelain enamel—inside and out. It is rust proof and non-corrosive. As easy to clean as a china dish.

A Custom-Built Model, Too

The Standard model 21 is finished in Thor green. A custom built model with white enamel splash tub and accessories in polished aluminum is available at slight additional cost. The water pump illustrated is furnished also at small extra cost.

Manufactured By

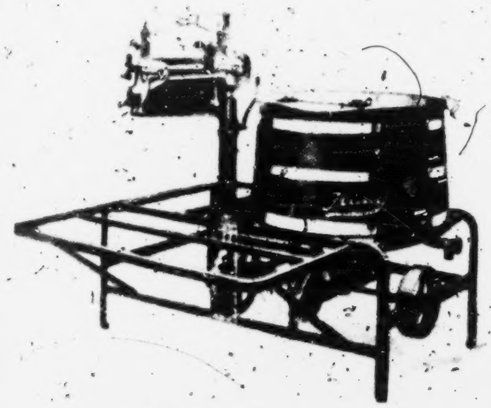
HURLEY MACHINE CO., Chicago

Established 1906

7 1 7

PLAINTIFF'S EXHIBIT No. 25

25



Full Bench NuWay

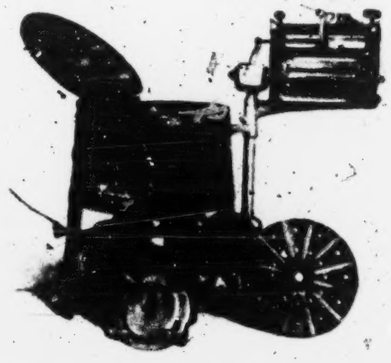
[illegible] same construction as the short machines shown on preceding pages, but has [illegible] capacity for three extra tubs. The extension rack at the side folds out of the [illegible] and the [illegible] occupies but little space when not in operation.

WHEN ORDERING "NUWAY" SPECIFY WHETHER SHORT OR FULL BENCH STYLE IS WANTED

Notice that all machines are provided with extension castings by means of which the height [illegible] quickly adjusted. The electric machines are equipped with casters.

The drain pipe used on our machines is an unusually finished piece of workmanship and enables operator to drain tub quickly and without [illegible].

The SUPREME



stave leg model, underneath drive machine, is absolutely the most complete and convenient stave leg washer to be found on the market. Made of extra heavy stock same as our regular tubs, it cannot be excelled for durability. The legs are a continuation of the staves, which means a substantial machine—no loose or wobbly legs. In all other ways, construction same as bench machines.

Note that both motor and drive wheel are entirely under the tub, well out of the way and perfectly guarded so there is no possibility of operator's clothes becoming entangled.

All models furnished either with electric motor or equipped for use with engine power. Speed of main drive shaft 250 R. P. M. Electric machines equipped with special washing machine motor, designed to start and operate under heavy load. In ordering electric washers, be sure to specify current and voltage required.

THEY WILL TAKE WASH DAY OFF YOUR CALENDAR

Don't Have Wash Day!

Sun	Mon.	Tue.	Wed.	Thu.	Fri.	Sat.
			1	2	3	4
5	H	7	8	9	10	11
12	A	14	15	16	17	18
19	A	21	22	23	24	25
26	G	28	29	30	31	

Have HAAG DAY!

Haag Brothers Underneath Drive Washers

Absolute Safety — Unequalled Convenience — Perfection of Simplicity

these are the striking features of the group of underneath drive washing machines illustrated on the following pages.

BUILT IN THREE STYLES—short bench, long bench and stave leg—they provide a power washing machine for every housewife according to her needs.

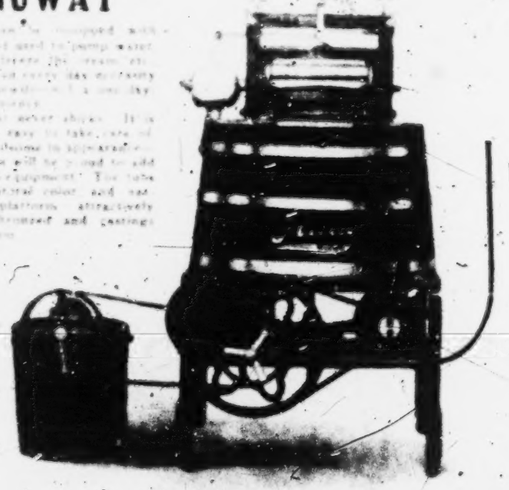
EXTRA HEAVY TUBS give double the service of the ordinary light tub generally used. The extra thickness also serves to retain the heat in the water much longer and does away with the sloppiness of constantly replenishing with hot water. Unusually deep corrugations act as a most efficient wash board, making hand rubbing unnecessary.

Why Drag Along by the Old Hand Methods, or Use an Inferior Machine?

BUY A WASHER MADE BY HAAG BROTHERS

24

The "NUWAY"

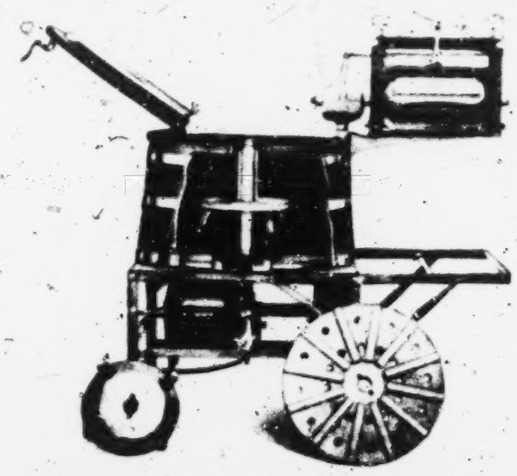


To Get the Best Results

[illegible] all [illegible] are [illegible] (In [illegible] replaced the [illegible]

ICE CREAM THE WASHDAY DESSERT

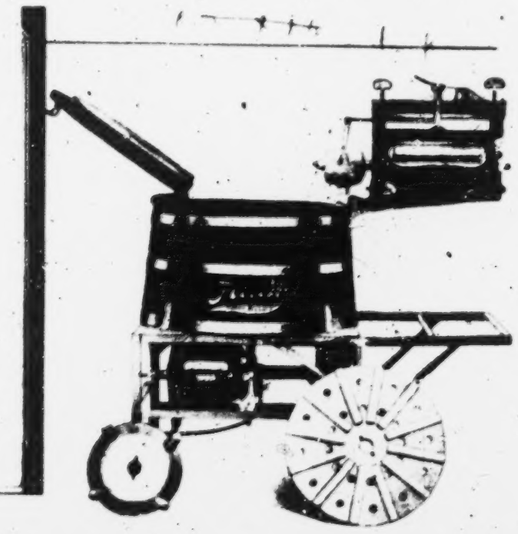
[illegible] washday dishes, [illegible] the washings out of the way early and [illegible] ice cream for dinner at the same time.



EVERY HOUSEWIFE WILL LIKE the two washing principles combined in one machine. A flat dasher for rubbing the delicate fabrics, laces, etc. and the peh dolly for general washing.

NOTE THE CONSTRUCTION OF THE UNDERNEATH DRIVE, as shown by above cut—All mechanism under the tub thoroly protected. Dolly slides up and down on center post coming up thru bottom of tub. All castings heavily galvanized.

You will observe that center post is made with shoulder, and screws firmly thru tub to plate underneath. The use of gasket under the shoulder insures the connection being absolutely water tight. **No danger of leakage.**



FOUR POSITION REVOLVING WRINGER enables operator to wring into and out of two sides of tub. Note particularly the two handled reverse lever, which is accessible from either side of the wringer. Operator does not have to reach across wringer or to the end of it for reverse lever—it is always close to the hand. This lever is a safety device in itself in addition to the safety release of the wringer, and means double protection for the operator.

THE CONVENIENT EXTENSION RACK for rinse tub can be folded out of the way when not in use.

718

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PAGE

PLAINTIFF'S EXHIBIT No. 26

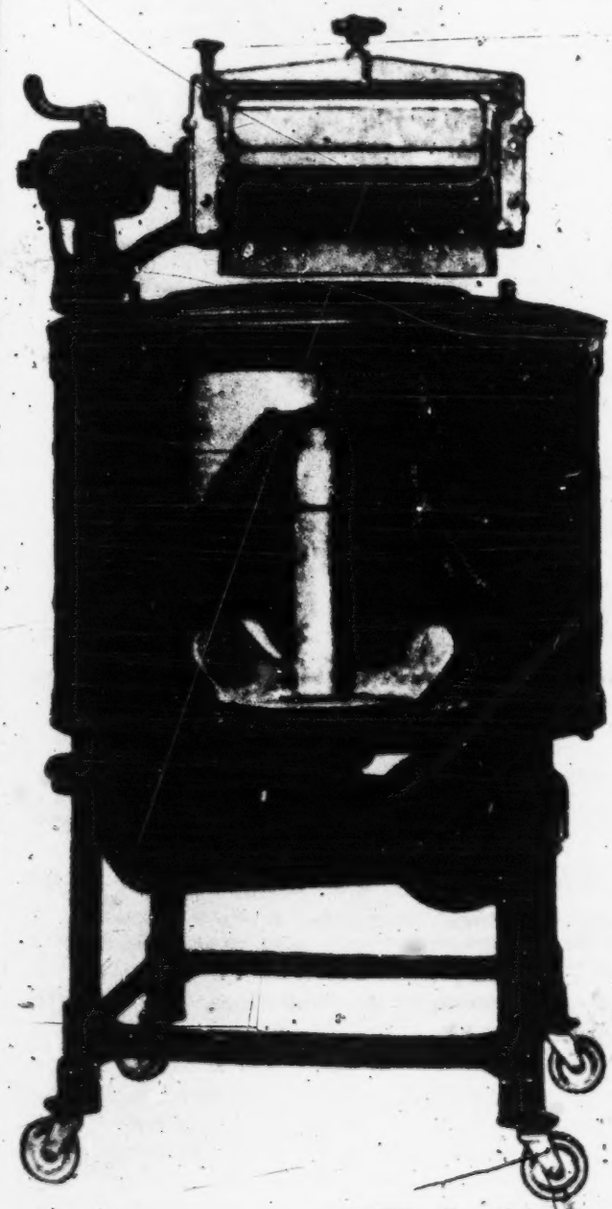
ELECTRIC WASHING MACHINES

HAAG VORTEX

Attracting Attention All Over the United States

This latest product of the Haag Brothers Company "went over the top" in less than 6 months from the time it was first offered to the trade.

The Cut-out view below is quite self-explanatory. The cast aluminum Haag Vortex is what does the work. This "Vortex" rests at the bottom of the copper tub and beneath the fabrics to be washed. It makes a ¾ turn and reverses. Rotating alternately back and forth in this way, a peculiar motion is given to the water, forcing it up along the sides of tub and drawing it down at the center where it whirls rapidly back and forth.



Absolute Cleanliness is Attained in Half the Time Ordinarily Required.

Another feature of this Washer is the fact that the clothes are above the "Vortex" Agitator, not below it. They are not subjected to a continuous rubbing and pounding. Instead, the cone shape of the Vortex keeps the clothes separated, giving them full benefit of the motion of the soapy water. The action is so thorough, so efficient, that even the deepest seated dirt cannot withstand it. Through and through, back and forth, the foamy, soapy water is forced, removing every trace of dirt, leaving the clothes clean, fresh, sweet smelling.

Cleans Thoroughly, Quickly and Efficiently

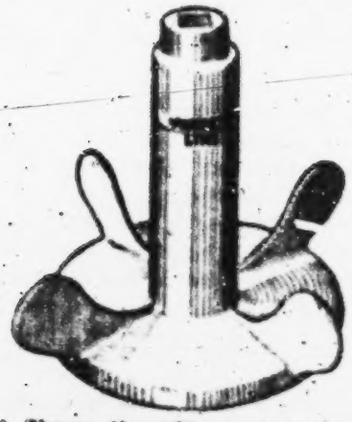
With the advent of the new principle embodied in this Haag Vortex Washer, comes a greater freedom from wash day worries than has ever been enjoyed by the housewife. For it is a new principle—a better way—a more efficient method of washing clothes, taking out every vestige of dirt without rubbing—without injury to the most delicate fabric.

Washes the heaviest blankets as well as the daintiest lingerie.

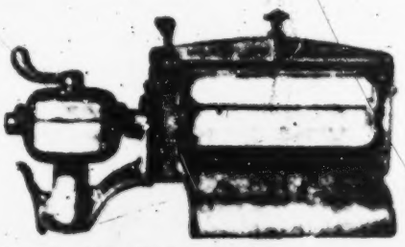
NOTE—For Price See Next Page.

ELECTRIC WASHING MACHINES

HAAG VORTEX



Cut Shows the "Vortex" Agitator



Cut Shows the Haag Wringer. Note Compactness and Large Soft Rolls.

In Case of Emergency the Top and Spring Tip Back and Release Rolls.

Removing or Replacing Rolls is Easy. You Simply Lift Them Out.

The New Haag All Metal Swinging Wringer

This Wringer can be swung to reach the Washer, Rinse Tub, Bluing Tub and Basket. Can be operated independently or at the same time as the Washer.

Big, soft, 12x2 in. Rubber rolls leave the buttons on and in one piece—and in an emergency, a quick trip of the spring release removes all pressure from rolls. Can be adjusted to any desired tension.

Wringer can be locked in any working position. A Handy Lever throws it in or out of gear. Black Painted Wringer Gear Case.

Can be depended upon to give many years of uninterrupted service and satisfaction.

Specifications

Tub—Heavy 18 Gauge Copper, handsomely Burnished and Lacquer Finished. Nickel Plated inside. Will stay bright and clean a long time.

Frame—Heavy Gauge Iron, much more than just "strong enough". Legs are of 1½ x ¼ in. Channel Iron.

Gearing—Enclosed Gears and Belt provide both safety and good appearance and necessary lubrication is quickly accomplished.

Motor—Standard make. Full ½ H. P. and capable of handling large, heavy loads in both Tub and Wringer.

Casters—Large 2 in. easy rolling. Allow Washer to be easily moved about.

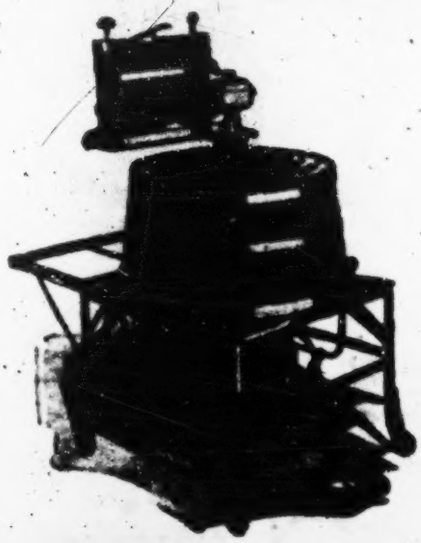
Each

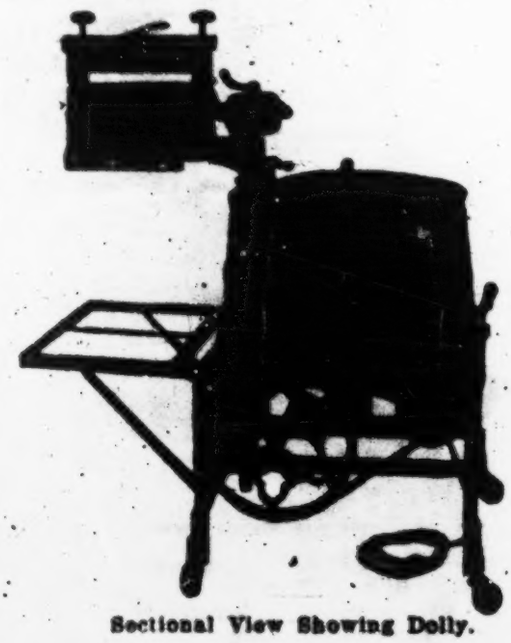
No. 60-E—Capacity 50 to 60 Lbs. of Family Wash Per Hour. 23 in. Diameter Tub, 34 in. High to Top of Tub. Complete with 10 ft. Cord with Plug. Shipping Weight 232 ½ Lbs. $147.50

Note—When ordering, always state Kind of Current, Voltage and Cycles.

WASHING MACHINES

HAAG NUWAY, SHORT BENCH





Sectional View Showing Dolly.

Cut Shows Dolly.

A Remarkably Successful Wood Tub Washer with Underneath Drive

Especially adapted for small Laundry Rooms and Homes where the washer must not occupy much space.

Sturdy construction, simplicity and mechanical perfection, are the keynotes in the manufacture and design of this washer. Neat, compact and attractive. Attractiveness and beauty made possible by the natural finish hub and bright aluminum bronze frame work.

Specifications

Tub—Strongly constructed of choice lumber. Handsomely finished in the natural wood, aluminum bronze finished hoops. Sides and bottom of tub deeply corrugated. Drains itself without tipping. Galvanized metal cover fits snugly into tub.

Dolly—Cast aluminum. Does away with all warping, all looseness of pegs and all liability of rust stains which sometimes happens when ordinary nails are driven into wood dollys. Is better and washes better.

Wringer—Swinging, reversible. Can be swung in any direction and locked at any point. Wide, reversible drain board prevents slopping floors while wringing.

Stand—Made of angle steel, practically indestructible. Bench for extra tub folds when not in use, permitting storing washer in small space.

Underneath Drive—All mechanism is under the tub, providing perfect safety. Silent, smooth running machine cut gears are all covered. No mechanism of any kind on top of tub. Galvanized iron castings.

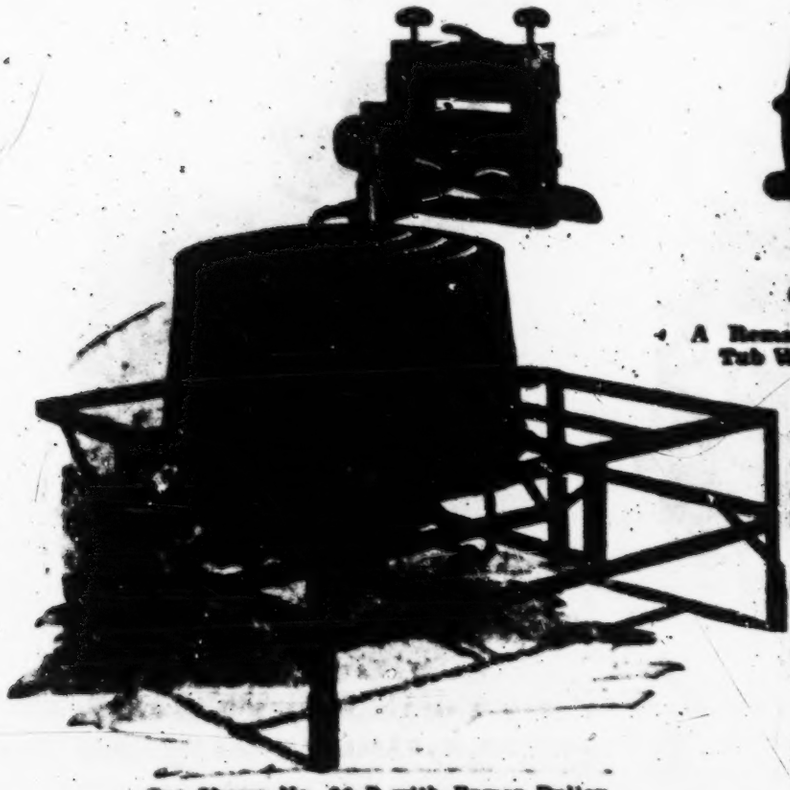
Belt—Haag V shaped. Does not stretch, slip or break.

	Each
No. 10-E—Electric, Complete with Electric Motor, with Cord and Plug, Shipping Wt. 241 lbs.	$69.50
No. 10-P—Power, Complete with Power Pulley for Flat Belt, to be Operated by Gasoline Engine, Shipping Weight 206½ Lbs	51.50

Note—When ordering, always state kind of current, voltage and cycles.

WASHING MACHINES

HAAG NUWAY, LONG BENCH



Cut Shows Dolly.

A Remarkably Successful Wood Tub Washer with Underneath Drive

Mechanically the same Washer as the Haag Nu-Way Short Bench Machine shown on preceding page, but has long bench.

Sturdy construction, simplicity and mechanical perfection are the keynotes in the manufacture and design of this Washer.

Neat, compact and attractive.

Cut Shows No. 30-P with Power Pulley.

Specifications:

Tub—Extra heavy and strongly constructed of choice lumber. Handsomely finished in the natural wood. Aluminum bronze finished hoops. Sides and bottom of tub deeply corrugated. Drains itself without tipping. Galvanized metal cover fits snugly into tub.

Dolly—Cast aluminum. Does away with all warping, all looseness of pegs and all liability of rust stains which sometimes happens when ordinary nails are driven into wood Dollys. Is better and washes better.

Wringer—Swinging. Reversible. Can be swung in any direction and locked at any point. Can be operated independently or at the same time as the Washer. Wide reversible drain board permits clothes to be run through from either side and prevents slopping floors while wringing.

Stand and Bench—Strong angle iron, heavily galvanized. Full length permanent platform for rinse tub and folding basket rest. Practically indestructible.

Underneath Drive—The underneath drive places all mechanism, which is enclosed and thoroughly protected, out of the way and reduces wear and tear to a minimum on account of the short, direct drive. All castings are heavily galvanized. No mechanism of any kind on top of tub.

Belt—Haag V shaped. Does not stretch, slip or break.

	Each
No. 30-P—Power, Complete with Power Pulley for Flat Belt, to be Operated by Gasoline Engine; Shipping Weight 252 Lbs.	$55 50
No. 30-E—Electric, Complete with Electric Motor with Cord and Plug; Shipping Weight 217 Lbs.	93 50

Note—When Ordering No. 30-E Electric Machine, Always State Kind of Current, Voltage and Cycles.

PLAINTIFF'S EXHIBIT No. 27

KESTER
Self Fluxing SOLDER
Simple Safe and Sure

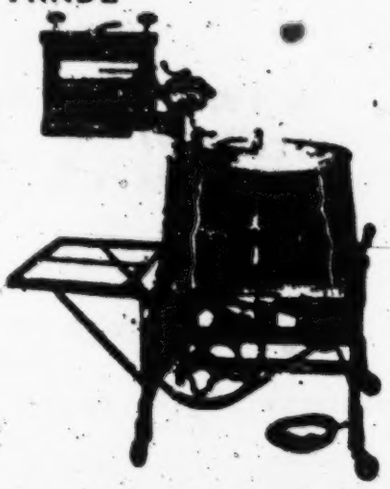
KESTER Acid Core SOLDER

Kester Metal Mender

Kester Radio Core Solder

Kester Radio Solder

CHICAGO SOLDER COMPANY
4201 Wrightwood Avenue, Chicago, U. S. A.
Originators of Self Fluxing Solder
Manufacturers of Solder and Soldering Fluxes
Your Jobber Can Supply You



A "Tried and True"
"Old Reliable"
Wood Tub Washer

Put on the market years ago, the

HAAG NUWAY

immediately made friends—and it has been making and holding them ever since.

Not a single basic change has been made, but a number of refinements are noted: A cast aluminum peg dolly has replaced the wooden dolly; soft wringer rolls now leave the buttons on and unbroken and rust-proof metal lid now avoids all liability toward warping.

The same strong metal frame, extra heavy tub and amply powerful motor remains!

Profitable to Sell—
Pleasing to Own!

WRITE FOR DETAILS

HAAG BROS. CO.
PEORIA ILLINOIS

HUBER BROS. MFG. COMPANY
Manufacturers
110 Third Ave. North MINNEAPOLIS

PLAINTIFF'S EXHIBIT No. 28

721

THE FAMOUS DIETZ POWER WASHING MACHINES

Different from all others

NO INTERIOR SPRINGS ... NO FLOATING DASHER

Pat. Jan. 26, 1904.

Manufactured by THE JOHN DIETZ MFG. CO. CINCINNATI, OHIO

COMPARISON CREATES VALUES

WE INVITE COMPARISON

¶The most perfect power machines on the market. ¶Fully guaranteed and protected by patents. ¶Operated by ordinary water pressure—attach hose to faucet, turn on the water and the motor does the work.

SOLD BY DEALERS WHO SELL QUALITY.

THE DIETZ POWER WASHER

¶The accompanying cut shows an open view of our Prong machine. You will notice there is no rod or other projection through the center of the dasher, which tangles or tears the clothes. This is a very important feature and should be given consideration by every purchaser. Notice the large opening when lid is thrown open which makes inside of tub easily accessible.

A Washer of Recognized Merit

Used by People Who Know

The Wringer Attachment is the most approved type and admits the attachment of large size wringer. The entire machine is deeply corrugated on the inside like the surface of a wash board, which is very effective when used in conjunction with our style dasher.

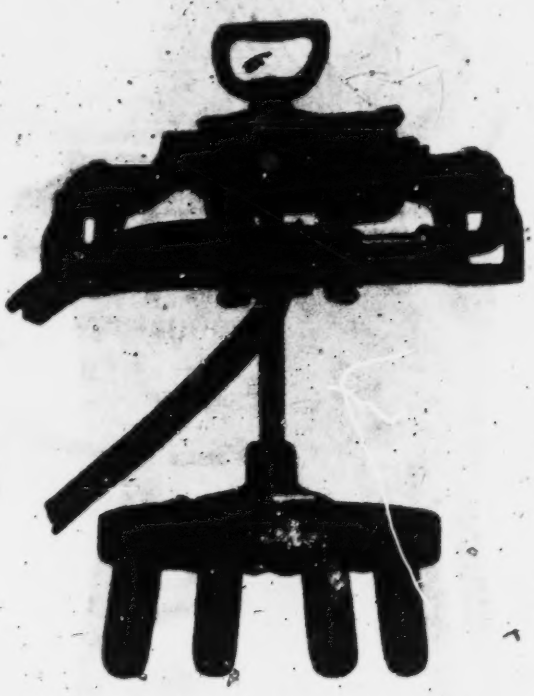
The Tub is made of the best grade of Louisiana cypress, considered by scientists to be the best wood obtainable for tubs, tanks, etc.

Finish—Natural wood with two coats high grade varnish.

THE DIETZ POWER WASHER

The dasher in the Dietz Power Washer does not float, but is bolted to the end of a grooved shaft which slides in a gear with a key-way, thereby adjusting itself to the amount of clothes to be washed. A floating or collapsible dasher is uncontrollable, and therefore, when lid of machine is closed the dasher slides up under the lid where it remains. To properly wash clothes it is necessary to have the dasher amongst them, and this result cannot be obtained from a machine that has a dasher which floats. **The Dietz Power Washer is the only machine on the market that has no floating dasher.**

No Complicated Connections to worry you —turn on water, the machine does the work.



Hands Free for other Work while Machine is Washing.

The handle at top of dasher stem is used to raise the dasher out of clothes when opening machine and to keep dasher up when closing machine to prevent crowding clothes to rear of tub.

The Dasher Shaft has a long double bearing which keeps the dasher rigid and in place, and prevents same from wobbling and swaying from side to side.

The Gear and Rack are completely shielded which prevents any possibility of operator being hurt.

The water from exhaust hose can be used for rinsing purposes.

727

THE DIETZ RUBBOARD POWER WASHER

¶This machine is especially adapted for washing fine garments and linen, but can also be used for ordinary clothes. The tub is the same high quality as used in the Dietz machine. The dasher in this machine, you will notice, is a large circular rubboard, covering the entire circumference of tub. It has large nubbins which gently rub the clothes while carrying them through the water, the large holes

Insist on The Dietz — there is none just as good.

A Machine of Quality!

Thousands of Satisfied Users.

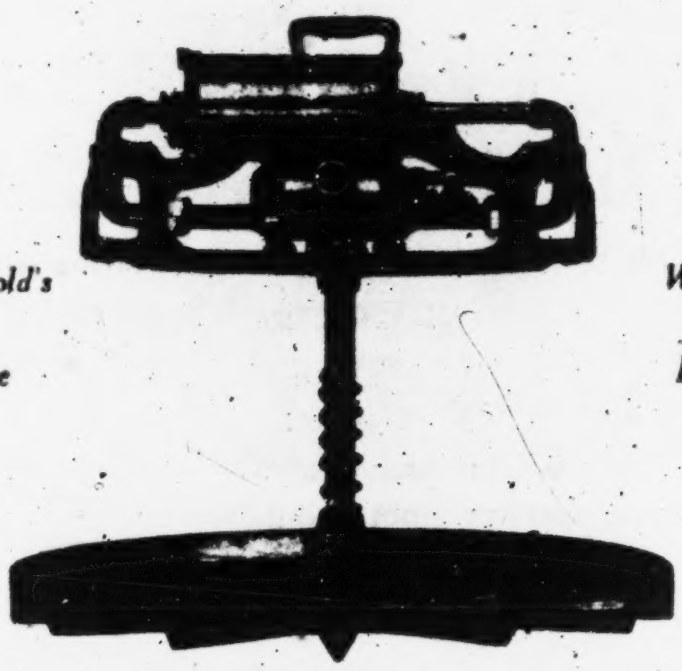
Save your Health, Time, Strength and Clothes

in dasher when forced upon the clothes cause a suction, forcing the hot soapy water through the fibers of the clothes. You do not have to pack the clothes against the sides of the Dietz Power Washer to get results. The dasher is supposed to do the work and therefore should come in contact with the clothes. The Dietz Power Washers, owing to their different construction, are guaranteed to wash the clothes cleaner, in less time, with less pressure than any other power washer on the market.

The Motor is constructed on scientific principles, all wearing parts being made of the best quality of Red Brass, thus preventing rust and corrosion, making a machine that will last a lifetime with ordinary use. The valves are located in a separate valve body. The cylinder being absolutely free from valves and springs allows the entire area of same for water, giving the efficiency of every drop that enters it, making the most powerful motor on the market.

The Cylinder Heads and heads on valve body have no gaskets in joints but are screwed on with a fine thread, preventing leaks.

The Household's Chief Treasure



Makes Washday a Pleasure

The Motor is placed on lid over center of tub so arranged that there will be no heavy weight to lift when opening washer, and is encased in a nicely finished frame which is fastened to the lid with two bolts. On account of the three wing floating valve used, our motor will start at any point and will not short-stroke. *The Dietz Motor consumes less water*, and develops *more power* with *less pressure* than any other.

The Spring used to regulate the valves is made of Phosphor Bronze, and being exposed and free from contact with the water will not break or loose its elasticity.

P 28

SUPERIOR POINTS *of* MERIT
in the
Dietz Power Washers

The Motor has no concealed springs, therefore is not liable to get out of order—has a floating valve, assisted by one external spring which does not come in contact with the water. This style valve is preferable to a complicated auxilary valve used in motors without springs or a slide valve which soon wears out on account of friction, and requires less pressure to operate it.

The Dasher Shaft has a long double bearing which prevents the dasher from wobbling. The DASHER has no Center Dasher Post which tangles and tears the clothes and DOES NOT FLOAT.

The Gear and Rack are completely shielded, which prevents the operator from being hurt

OUR GUARANTEE

Each motor is tested and inspected thoroughly before leaving our factory, and every one is guaranteed by us for one year against any defect in material or workmanship.

PLAINTIFF'S EXHIBIT No. 29

NEW NEW

Sell It In 1925! Sell It In 1925!

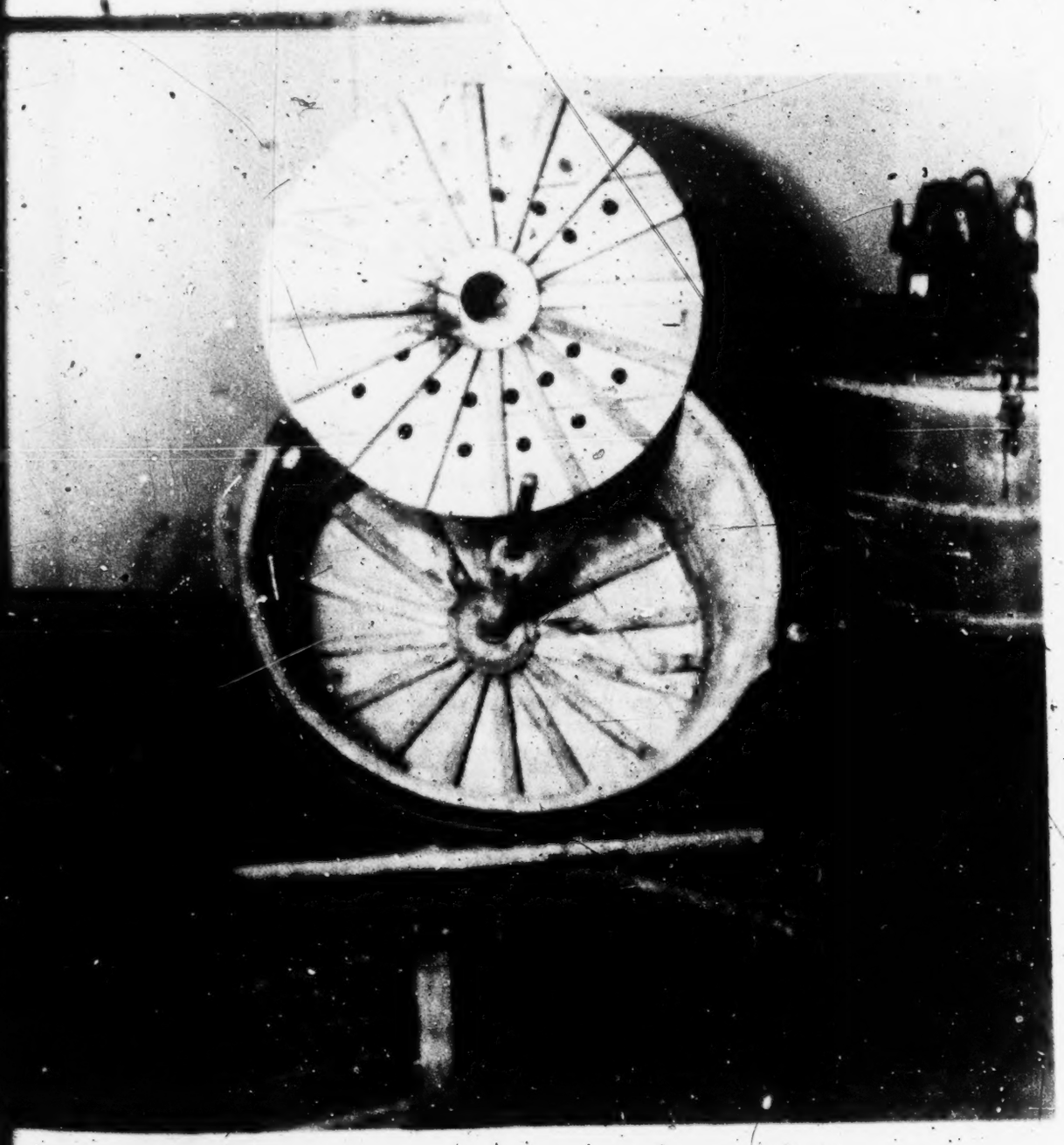
The Latest Product of the Genius of "George" and "Al"

The New Haag

VORTEX

This IS a new washer to the trade but it has been tested out for more than a year preceding this announcement.

PLAINTIFF'S EXHIBIT No. 30



PLAINTIFF'S EXHIBIT No. 31

7332

The Latest Version of

"THE THREE TWINS"

Here are the THREE HAAG TWINS—"George," "Al" and their equally sturdy and robust HAAG TWIN TUB machine.

ALL THREE TWINS ARE ALIKE—All three of them are strong, [illegible] and built for (and accustomed to) hard work. "George" and "Al" are to be found every day right out in the factory, dressed as shown—both busily engaged in actual production, experimental work, pattern making or the general supervision of their plant.

THE HAAG TWIN TUB WASHER

is as strong as over-size materials and the best of workmanship can make it. The tubs are made of 1¼ inch material and the frame is built of steel braced like a bridge. A long steel bench is provided for the rinsing tubs.

Each tub has a separate control—a very advantageous feature. Use one tub or both, as wished.

Each tub has its own dolly—as pictured. The flat type is especially adapted to delicate fabrics.

Each has reliable, reversible wringer with large soft rubber rolls that have become ON.

The motor is over-size and of standard make—amply powerful to operate both tubs and wringer

It is really two washers in one—the ideal equipment for large families or wherever abnormal washings are to be done. Write for prices and discounts.

HAAG BROS. CO. - Peoria, Ill.

HUBER BROS. MFG. CO., Distributors 116 Third Ave. North MINNEAPOLIS

Haag Nu-Way Electric takes Washday off the Calendar

Special Features----

Agitator.

This new type agitator is one of our latest improvements and has been found equally satisfactory in washing delicate fabrics or heavy clothes.

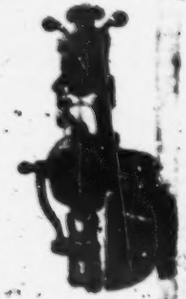
The ribs take hold of the clothes from the center to the outside and rub them against the corrugations on the bottom sides and of the tub. They also serve to force currents of dirt-cutting suds through the clothes which reduces the amount of rubbing necessary to get the clothes clean.

The clothes receive the proper pressure down and out against the tub corrugations by the weight of the agitator.

The Agitator by sliding up or down on the shaft in the center of the tub can wash few or many clothes equally well.

WRINGER

This illustration shows the revolving feature of the wringer. The patent locking device holds the wringer firmly in any position desired. It has no "notches" or any snapping "plate" but can be locked so that the water will drain back into the tub.



TUBS

Compare these tubs and note the extra size of the large heavy tubs, greater capacity—more durable—better service.

We use an unusually heavy, large size tub. It is made of 16-inch thick stock with sides measuring full 14-inch thick and the bottom 13-16-inch thick. When you compare these dimensions with the thin sides and bottoms of regular 13-inch tubs you cannot fail to be impressed with the advantages of the heavy tubs. They are not only of greater capacity, but they have unusually deep corrugations in the sides and bottom, which provides an additional and important washing feature. Our tubs will outwear at least two ordinary tubs and not only add to the durability of the machines better appearance, as well.

Ordinary Tub

Our Tub

Provident

Wash Day a Pleasure.

Peoria, Ill., May 15, 1916.

We have been using Haag-Nu-Way Electric washer two years and we are more than pleased with it. It makes washday a pleasure.

MRS. PAUL E. MEYER.

Could Not Do Without Haag Washer.

Spragueville, N. Y., February 1, 1916.

Our "Haag" Washer is the greatest labor saver we have. We could not do without it.

MRS. GEORGE ADAMS.

Doubters Say!
Don't Do The Work Like The HAAG.

[illegible] OBER, Minn., R. D., January 22, 1916.

In your advertising I am sending you list of my customers who are using your electric washers. These people have all tried out several other washers but, without exception, state that none of them do the work like HAAG.

SOUTH SIDE STORE
[illegible] S. HALSTED STREET
Phone Eng. 1305

Auburn, Ill., January 12, 1916.

I have sold nearly a dozen of your Washers in the last year and find every one who bought one of them to be perfectly satisfied. It's a good, well made washer.

T. B. BECKMAN.

Giving Good Satisfaction.

Morgan, Minn., January 18, 1916.

We have recently taken on your line of washers and all that we have sold are giving good satisfaction.

THE BIG STORE, Inc.

SOLD BY

Chicago Washing Machine Co.

4119 W. Madison St. — Phone Garfield 2098
1962 Milwaukee Ave. — Phone Humboldt 1860
202 S. Wabash Ave. — Phone Harrison 260

J. W. GREAS, Prop., CHICAGO, ILL.

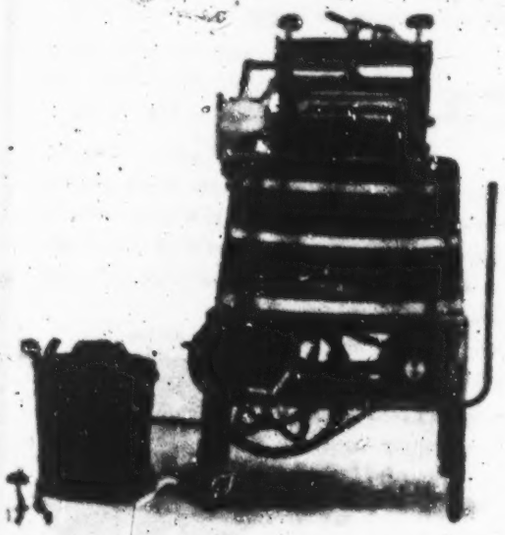
One Woman will tell another

about Haag Nu-Way Electric

PLAINTIFF'S EXHIBIT No. 82

82

UBLE DUTY

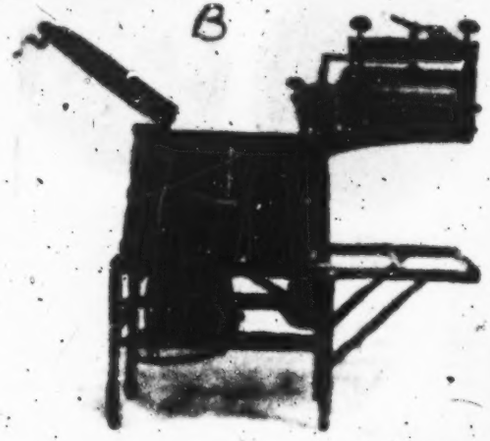


…you have been without a power washer you have been …ing yourself and family an injustice. To put up with the …methods of doing the family washing any place where …e is electricity is a big mistake. You can do a large wash…ing in one-half the time with a Haag NuWay Electric washer.

One best advertisement is what one woman tells another about the Haag NuWay Electric Washer. One enthusiastic NuWay user says "It is so easy to operate and I think so much that really wash day is a pleasure. I can also have a delicacy frozen dessert with but very little extra work. About all one has to do with the NuWay is hang up the clothes."

Users of Haag Machines cannot say too much in favor of them. The most delicate fabrics, laces, silks, curtains and the heavier pieces may be washed without any damage whatever.

INSIDE INFORMATION



The operator automatically adjusts itself to any number of pieces to be washed. The peg dolly type which is shown in the tub above is for the heavy pieces while the flat ribbed type shown on another page is for the more delicate fabrics.

The tub is extra heavy having corrugated sides and bottom, which provides an additional important cleansing feature. Our tubs will outlast two ordinary tubs. The lid of the tub is light and easy to lift as there is no heavy mechanism attached to it.

The underneath drive places all mechanism, which is enclosed and thoroughly protected, out of the way and reduces wear and tear to a minimum on account of the short, direct drive. All castings are heavily galvanized and there is no danger of leakage. The frame-work is built of extra heavy non-rusting angle steel. In fact the best of material is used throughout. Everything is thoroughly constructed.

The wringer, which is one of the best made, swings to any position and can be operated from either side of the tub. Simply lock it in the most convenient position. Clothes may be run through from either side of wringer, as it is reversible. It runs independent of the tub and may be operated while the clothes are being washed in the tub.

SAFETY FIRST

…Safety Lever and the Start-…d Stopping Levers within …each at all times.

…lever on top of wringer is an instant release for the rolls so …the clothes become knotted or bunched. All that is …y is to press the lever and the rolls are released as …the illustration on the next page.

…ers are completely covered on both the washer and …which insures absolute safety to fingers and clothes.

GUARANTEE

Rolls Released.

Rolls Released by Pressure on Safety Lever on top of Wringer.

We call your attention to the Special Features on the next page and the testimonials on the last page of this folder and ask you to please call at your dealers and have him show you the NuWay Electric.

With the NuWay your washing will be finished before half the morning is gone. The NuWay saves Time, Labor, Worry, and Clothes.

GUARANTEE

The Haag NuWay Electric Washer is warranted to be free of defective material or faulty workmanship and Haag Bros. Co., agrees to replace any time within one year, any defective working parts upon our request for their return.

The electric motor is warranted for one year, according to terms of warranty given by the manufacturer.

HAAG BROS. CO., PEORIA, ILL.

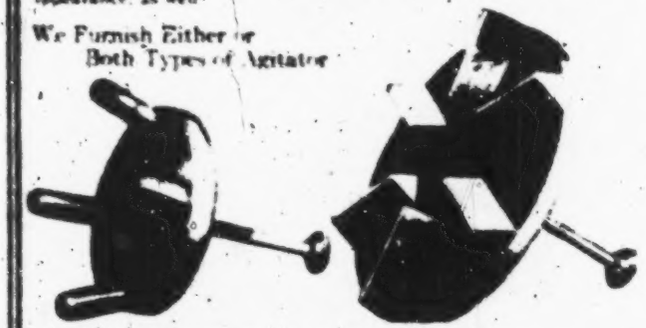
Brady Boards! Here are the Reasons

The Tub at the Left is the Regular Tub on other Washing Machines. Our Tub speaks for Itself.

Compare these tubs and note advantage of the large heavy tub, greater capacity—more durable—better service

We use an unusually heavy, large size tub. It is made of 11-gauge stock with sides measuring full 1/4-inch thick and the bottom 1/8-inch thick. When you compare these dimensions with the thin sides and bottoms of regular 11-inch tubs you cannot fail to be impressed with the advantage of the heavy tubs. They are not only of greater capacity, but they have unusually deep corrugations on the sides and bottoms, which provides an additional and important washing feature. Our tubs will outwear at least two ordinary tubs and not only add to the durability of the machines but to their appearance, as well.

We Furnish Either or Both Types of Agitator



This new type agitator is one of our latest improvements and has been found equally satisfactory in washing delicate fabrics or heavy clothes.

The rib-tube hold of the clothes from the center to the outside and rub them against the corrugations on the bottom and sides of the tub. They also serve to force currents of dirt-cutting suds through the clothes which reduces the amount of rubbing necessary to get the clothes clean.

The clothes receive the proper pressure down and out against the tub corrugations by the weight of the agitator.

The Agitator by sliding up or down on the shaft in the center of the tub can wash few or many clothes equally well.

WRINGER

This illustration shows the revolving feature of the wringer. The patent locking device holds the wringer firm in any position desired. It has no "notches" or set stopping place but can be locked so that the water will drain back into the tub.

ROLLS RELASED BY PRESSURE OF SAFETY LEVER ON TOP OF WRINGER

The lever on top of wringer is an instant release for the rolls when the clothes become knotted or bunched. All that is necessary is to press the lever and the rolls are released as shown in the illustration.

All gears are completely covered on both the washer and wringer which insures absolute safety to fingers and clothes.

PLAINTIFF'S EXHIBIT No. 33

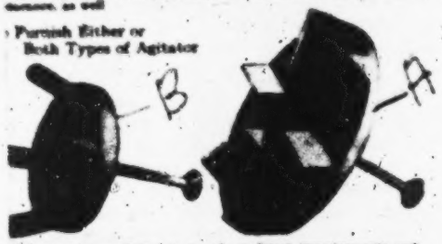
735

Haag Leads. — Here are the Reasons An ALL-AROUND Machine

The Tub at the Left is the Regular Tub on other Washing Machines. Our Tub speaks for Itself.

Compare these tubs and gain advantage of the large heavy tub. We sell an unusually heavy, large size tub. It is made of 1/4 in. stock with plain corner or 3/16 in. stock and the patented dove tail. These two features (these themselves with the thin tub and lightness of similar tub) you cannot fail to be impressed with the advantage of the heavy tub. They are not only greater capacity, but they have unusually deep corrugations in sides and bottom which guarantee an efficient and important washing feature. Our tubs will outwear at least two ordinary tubs and only add to the durability of the machines but to their appearance as well

Furnish Either or Both Types of Agitator



This new type agitator is one of our latest improvements and has proved equally satisfactory in washing delicate fabrics or 12 blankets.

The disc takes hold of the clothes from the center to the outside of the tub, causing the compression on the bottom and sides of tub. The disc serves to force currents of the washing suds through the clothes which reduces the amount of rubbing necessary and thus preserves the clothes.

The fluted agitator has proven quite satisfactory in washing all kinds of clothes. The corrugations take hold of the clothes and force them against the sides of the tub, causing the compression on the bottom and sides of the tub. The fluted agitator also serves to force currents of the washing suds through the clothes which reduces the amount of rubbing necessary and thus preserves the clothes.

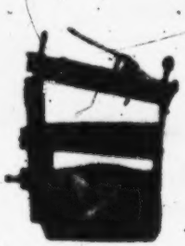
WRINGER

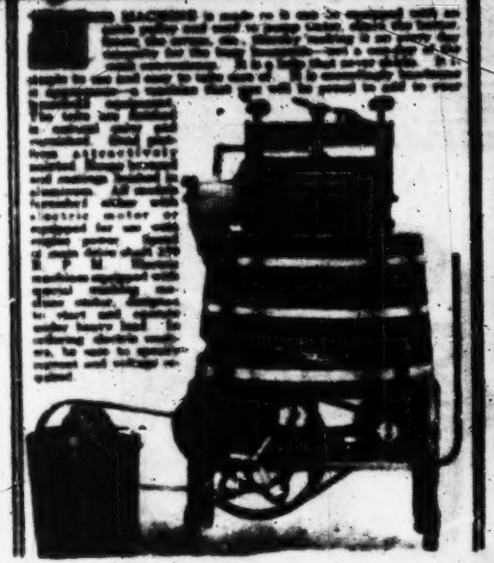
This illustration shows the revolving feature of the wringer. The patent locking device holds the wringer firm in any position desired. It has no "notches" or set stopping place but can be locked so that the water will drain back into the tub.

ROLLS RELEASED BY PRESSURE OF SAFETY LEVER ON TOP OF WRINGER

The lever on top of wringer is an instant release for the rolls when the clothes become knotted or bunched. All that is necessary is to press the lever and the rolls are released as shown in the illustration.

All gears are completely covered on both the washer and wringer which insures absolute safety to fingers and clothes.





PLAINTIFF'S EXHIBIT NO. 96

2360

THE NEW WAY The Gilbertson NUWAY The NUWAY The Gilbertson NUWAY

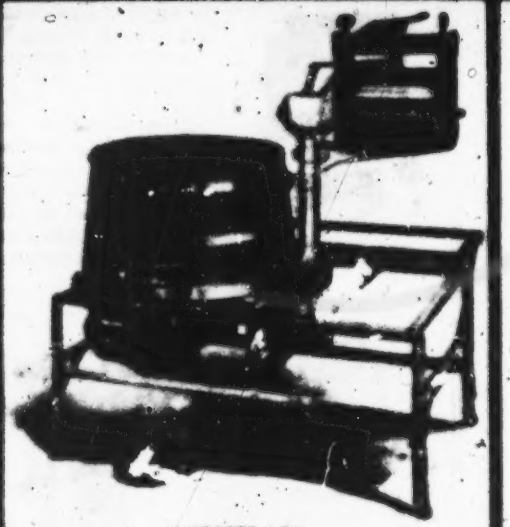
THE American Housewife of today knows that a washing machine is a necessity. If she does her own work, she cannot be without one, if she would be free from Monday misery. If she has a servant, she knows that the washing machine is just as necessary to keep the servant satisfied. The woman of today is efficient,—she saves her energy by utilizing the many modern labor saving devices, of which the washing machine is prominent.

If it were possible to put the HAAG Power Washing Machine into the homes of those women who have bought other makes, we know what would happen. The other makes would go, just as surely as the present users of HAAG washers wouldn't change for anything else under the sun.

We have studied our machines, and made them for the housewife. Mechanically as simple as possible, without sacrificing any features to [illegible]

[illegible] we want for your money, [illegible] and the best machine's advantage in construction. This [illegible] for the fact that every HAAG machine gives [illegible] and when it does wear out, after [illegible] of service rendered, another HAAG replaces it.

We encourage comparative tests of all kinds [illegible] have always proven us make [illegible] nine that women, the country [illegible]

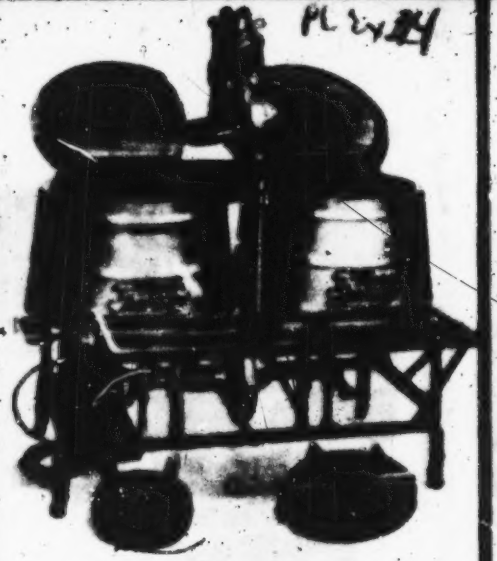


NUWAY UNDERNEATH DRIVE WASHERS

ABSOLUTE SAFETY
UNEQUALLED CONVENIENCE
PERFECTION OF SIMPLICITY

These are the striking features of the group of underneath drive washing machines illustrated on the following pages.

Built in Four Styles—short bench, long bench, double tub, and stove top—they provide a power washing machine for every housewife according to her needs.



NUWAY TWIN

The Nuway is the tub in each side, having both tubs equipped with complete washing mechanism. [illegible] the tub of [illegible] [illegible] [illegible]

PLAINTIFF'S EXHIBIT No. 35

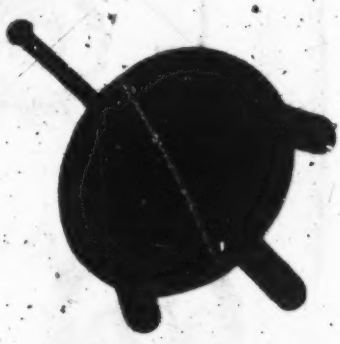
738

VOSS BROS. MFG. CO. DAVENPORT-IOWA

The Voss Dashers

The Peg Dasher

The Peg Dasher, used on Voss Pro Type Machines, is made from selected hard wood, hand turned and polished. The dasher rod is square set in a metal flange and rigidly bolted through the dasher block. It extends through the lid and determines its position by the quantity of clothing in the wash. The weight of the complete dasher rests on top of washing at all times, insuring perfect and quick results.



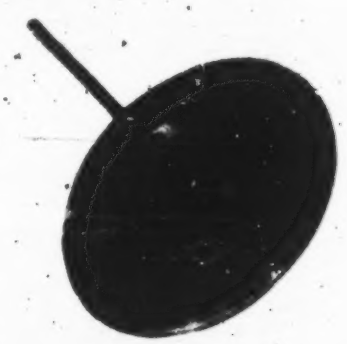
Disc or Flat Dasher

The Disc or Flat Dasher, which can also be used on Voss Pro Type Machines if desired, is made from clear cyprgs with slats or corrugations on bottom ¾-inch thick, giving a perfect rubbing surface. The dasher is 16½ inches in diameter and there is a malleable iron flange 15 inches in length on the upper side, contributing ample weight and strength. The disc is perforated with six holes 1¼-inch in diameter to provide additional agitation and circulation. The top of the dasher rod is fitted with handle for raising complete dasher when opening lid. Like the peg dasher, the disc automatically adjusts itself to the size of the wash, always resting on top of the clothes.

The Vacuum Dasher

The Vacuum Dasher, used on our Voss Vacuum Machines, is 12 inches in diameter. The outside shell is formed from one piece of iron, properly fluted or corrugated. The inside of the vacuum dasher is fitted with our auxiliary cup perforated and drawn from one piece of metal, affording additional strength and increased circulation. The inside of dasher is also equipped with three fingers or projections which materially assist in agitating the clothing. The copper valve with which this dasher is equipped receives air on the up stroke and automatically closes and expels hot air and steam through the wash on the down stroke. The dasher is galvanized after being assembled, hence there are no exposed parts to rust. It is extra large and strong, providing greater agitation than others. It draws no cold air from outside the tub to operate the valve, but takes the hot air from within the tub.

The wash water therefore remains hot much longer than if cold air were drawn from outside the tub.



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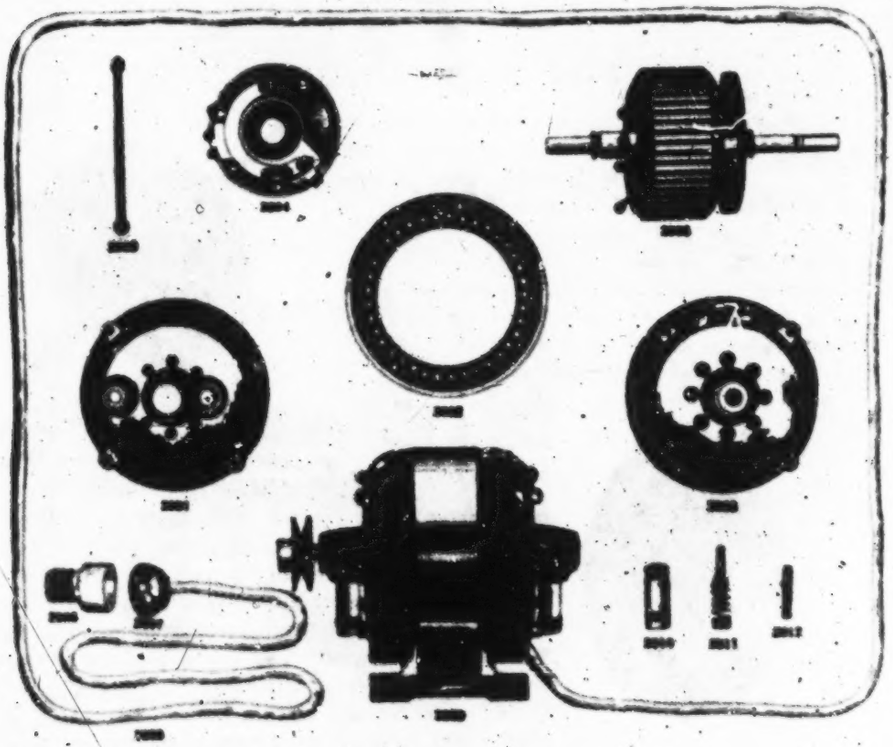
VOSS BROS. MFG. CO. DAVENPORT - IOWA



ELECTRIC motors give satisfactory service in exact proportion to the care they receive. Motors must be kept free from moisture and water at all times. Oil cups must be kept filled with vaseline. Keep belt on driving pulley reasonably tight. When washing is finished and when oiling motor or machine, pull out the socket. Do not depend on the current being turned off by the switch.

No. 2000	Complete Motor	No. 2006	Attaching Plug.
No. 2001	End Shield.	No. 2007	
No. 2002	Laminations.	No. 2008	Cord.
No. 2003	End Shield.	No. 2009	Bolt.
No. 2004	Collector ring with switch.	No. 2010	Oil Cup.
No. 2005	Armature.	No. 2011	Wick with Spring.
		No. 2012	Brush.

PLAINTIFF'S EXHIBIT No. 86

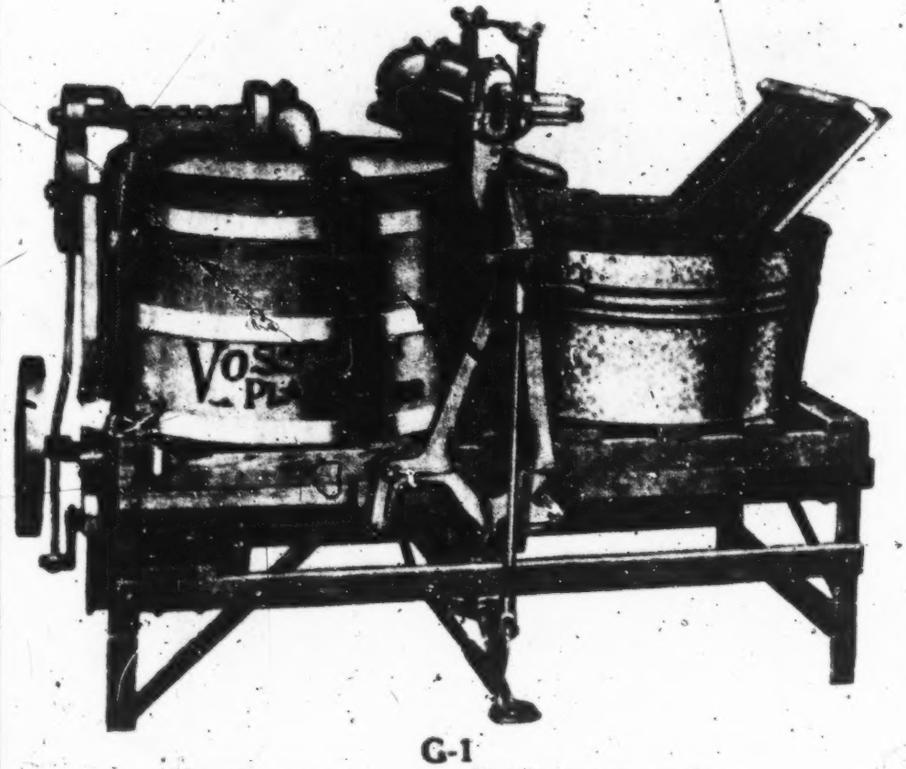
740

Important Improvements

— ON —

Voss Platform Washers

G-1 and E-1



G-1

Length, 4ft. 5 in. *Weight, crated, 850 lbs.*

TO give the users greater capacity, more convenience and the maximum efficiency for the space occupied, we have made the following improvements on Platform Washers, Types G-1 and E-1.

Page Tightly Bound

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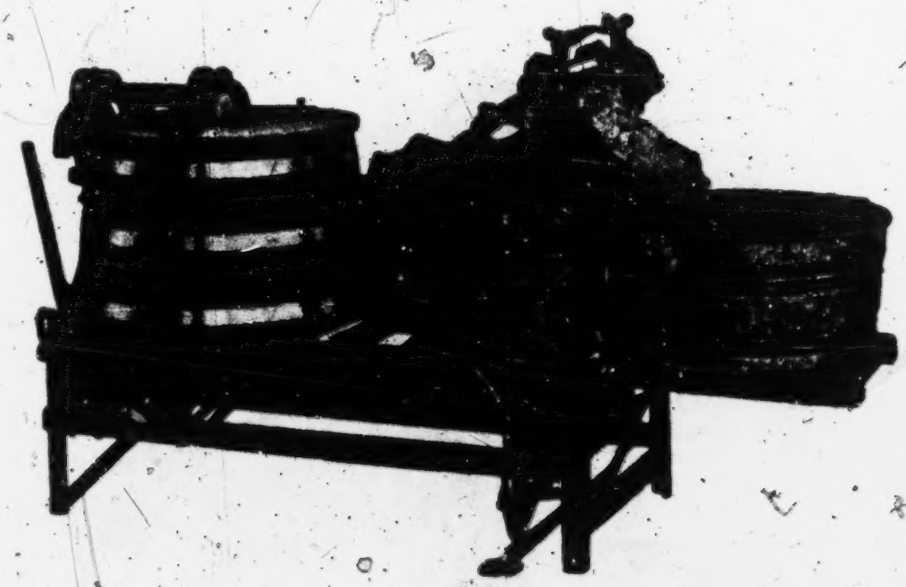
1ST.

Built the extended tray heavier and longer than heretofore so that it will receive and support a second tub instead of basket only, as previously built—giving tub capacity equal to any platform or swinging wringer machine.



G-1

Length, 5 ft. 10 in. *Weight, crated, 200 lbs.*

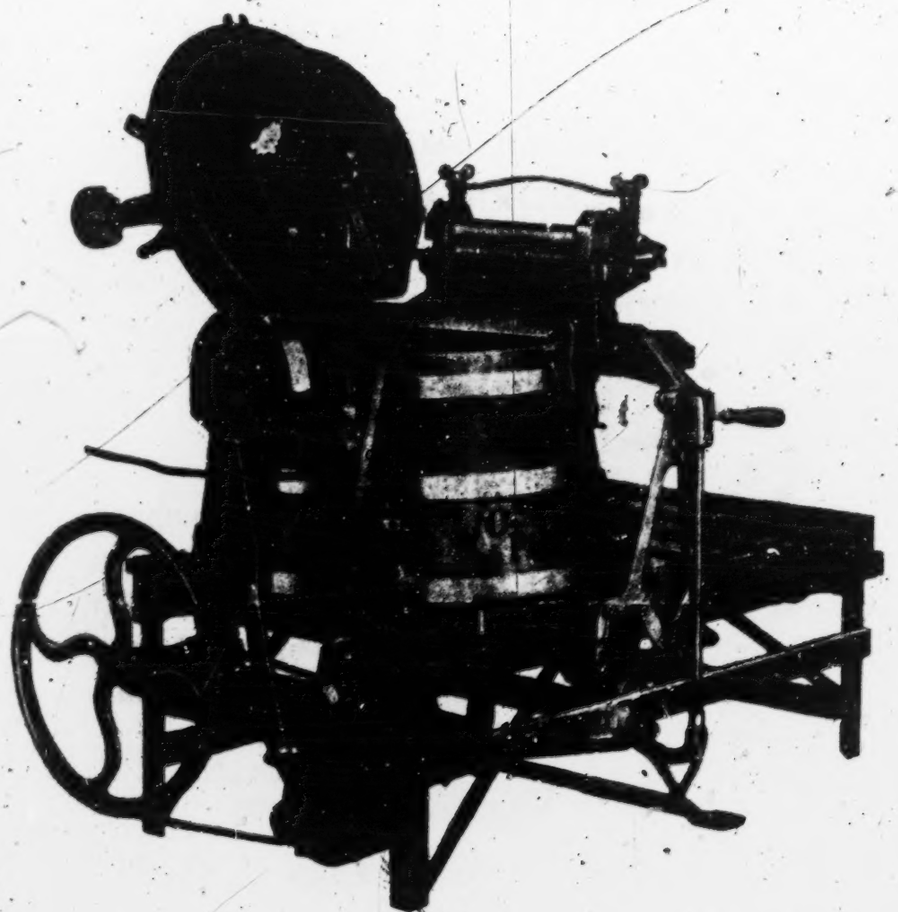
2ND.

Equipped the wringer frame with a wood clothes chute and drain board so that clothes can be wrung from the rinse tub into the bluing tub or from bluing tub to rinse tub.

7411

3RD.

Supplied a slatted wood tray which takes the place of clothes basket and fits on top of either metal tub to receive clothes when discharged from the wringer. This tray can also be used as basket for carrying the washing to clothes line.



E-1

Equipped with disc or flat dasher. Weight, crated, 320 lbs.

OUR Platform Washers with these valuable improvements, in addition to the many special features of convenience and safety already used, makes the "Voss Line" even more profitable to the dealer than heretofore, and merchants handling these Washers have only to display the machines properly to get the cream of the business.

We manufacture a complete line of

HAND,
POWER, and
ELECTRIC WASHERS

in the following types:

CONTINUOUS LEG STAVE,
PLATFORM or BENCH, and
SWINGING WRINGER.

All Voss Washers are regularly equipped with peg type dashers, but we supply on special orders, disc or flat dashers, as shown on page 3 of this folder. All machines equipped with special dashers must be shipped from the factory, at Davenport, Iowa.

Voss Bros. Mfg. Co.

Davenport, Iowa

PLAINTIFF'S EXHIBIT No. 37 711

Does Wash Day Rubbing Do You All Up?

Four Other Styles of Voss Washers

HERE are the other members of the Voss family of Washing Machines—all strictly high-grade and each a little better at its price than your money can buy of any other make. Ask your dealer for full information.

OCEAN WAVE

The old reliable—positively the best Rotary Washer made. Thousands in use all over Angeles.

AUTOMATIC

The "Automatic" Washer is equipped with a disc drive and a one piece metal wringer here. It operates easier and washes quickly. This is the ideal 6lb. dasher Washer

UNIVERSAL POWER

Can be run by any kind of power. Gas, Electricity, Steam or Gasoline Engine. Non-power wringer attached. Wonderfully simple—and absolutely safe.

VOSS ELECTRIC

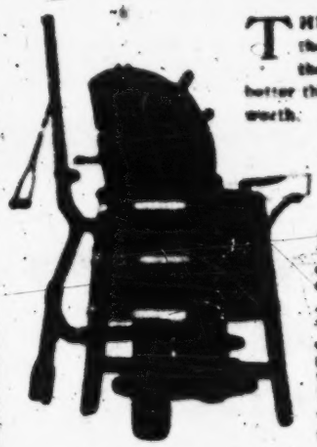
The Voss Electric Washer is a most complete and practical Electric Washing Machine being equipped with a reversible wringer controlled by either hand lever or foot treadle. The safest and most convenient Power Washer made.

1 48

How's This — Any Better?

DOESN'T this beat the old-fashioned back-breaking washboard? Would you worry about washday if the rubbing and scrubbing were left out—if you could sit down while your heaviest clothes and your finest delicates were washed snowy clean? Well, that's exactly what you can do with the light-running "Standard" Washer. It makes washday one of the easiest days of the household. It is not a luxury for the few, but is sold at a price within the reach of all. Ask your dealer to show you the "Standard" and explain to you why it is the easiest-working, longest-wearing and most efficient washer made

See The Sunshine Washer - TO-DAY!
Its The Best Your Money Can Buy



THERE'S a lot of difference in washing machines—even if they all do look about the same at first glance. And those differences count big in time and labor and the life of the machine itself. Of course, the poorest of washers are a great deal better than none at all—but when you buy you might as well get your full money's worth. And that means—Get a Sunshine.

The "SUNSHINE" is the One Best Washer for You—BECAUSE:

1ST. It is one of the lightest and smoothest running machines made. Can be easily operated by a child. That's because it is perfectly balanced and runs on ball bearings.

2ND. Will last for years. All metal parts are very scientifically and strong. Nothing to get out of order. Tub is made of finest Louisiana Red Cypress, thoroughly seasoned. Not affected in any way by hot or cold water.

3RD. Is the only washer made with [illegible] metal wringer box. This is a very important feature as wooden wringer boxes soon warp or crack, allowing water to leak all over the floor. The Sunshine wringer box is made of galvanized iron, and cannot leak, warp or wear out. Rollers are also made round on the inside to fit the curves of the tub, giving a larger opening for putting in and taking out clothes.

4TH. The Sunshine Washer is equipped with the famous "Vose Visible Basket" which adjusts itself automatically—works equally well whether the tub is full of clothes or contains but a single garment. And you'll readily see this is a [illegible] big advantage.

The Sunshine Washer is an unqualified success from every standpoint—the high grade product of a manufacturer who is thoroughly reliable. See your dealer about the Sunshine—today. After a trial of this tireless helper, you'll wonder why you haven't thrown that old back-breaking, clothes tearing washboard on the scrap heap long ago.

Voss Bros. Mf'g. Co.
DAVENPORT, IOWA.

1 49

PLAINTIFF'S EXHIBIT No. 38

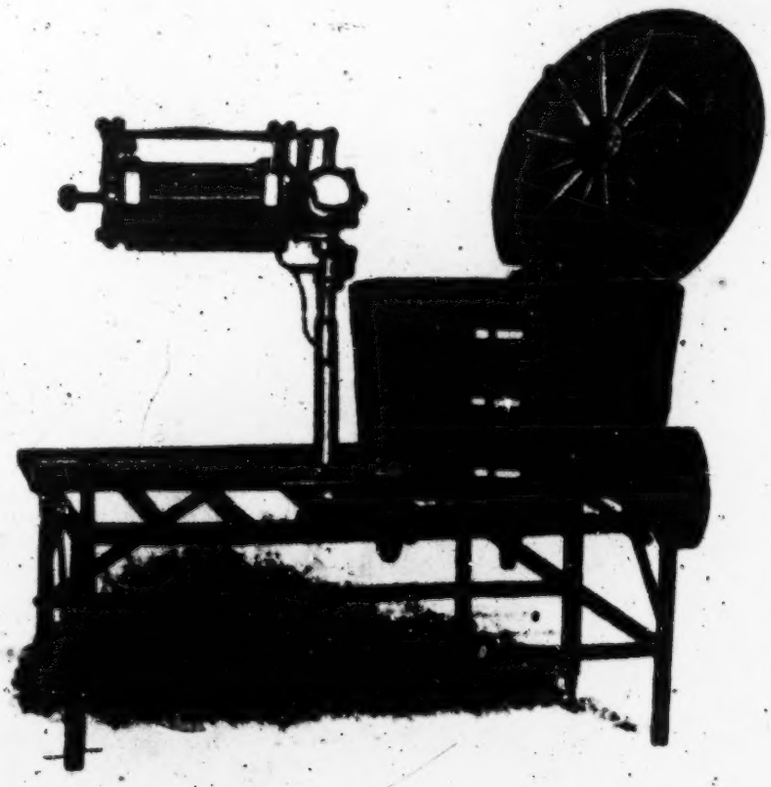
The Sterling Power Washer

With swinging reversible wringer
To be operated by gasoline engine or electric power

Steel Frame

Full length folding Extension Rack

Extra large detachable White Cedar Tub



Four Position Wringer

Large Reversible Water-board

Oscillating Tub Washer

Flat Disc no pegs

SUPERIOR MACHINE COMPANY

Successors to Superior Mfg. Co.

STERLING, ILLINOIS

Page Tightly Bound

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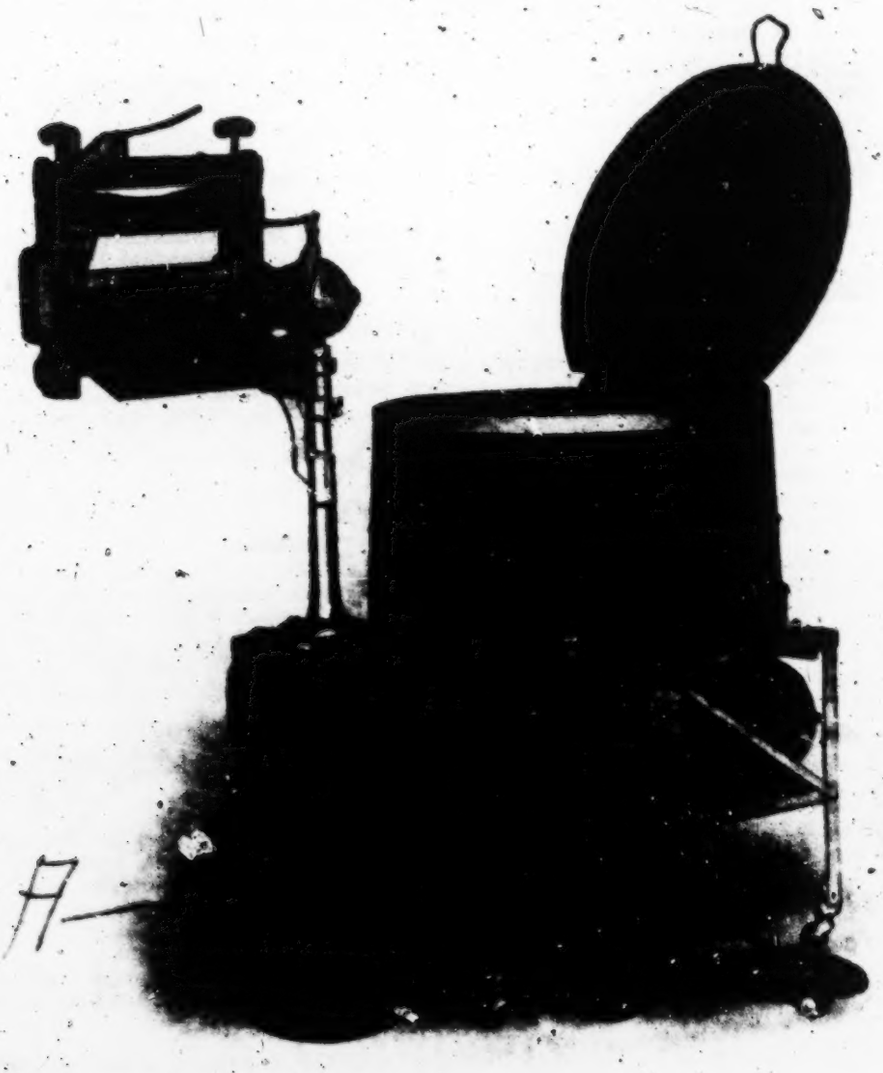
PLAINTIFF'S EXHIBIT No. 39

SUPERIOR MACHINE COMPANY, STERLING, ILLINOIS



No. D4

SUBMARINE ELECTRIC WASHER (SHORT BENCH)

The Submarine Electric Washer (Short Bench)

No. D4

This short bench electric is used where laundry tubs are installed or space is limited.

Some prefer a flat disc type washer and others a peg type; both have their merits, but with this machine, No. D4, the operator can use either the disc or the dolly in the same washing as preferred on the different kinds of clothes. This also enables the dealer to supply with the one machine all the demands of his trade for disc and peg type washers.

WASHING MACHINE—The tub furnished is of extra large size and thickness, and corrugated on sides and bottom. The drain spout is attached to the bottom so that it is not necessary to tilt the tub to drain it. The cover is made of selected cypress and opens freely, as there is no mechanism on it.

The tub mechanism is controlled by a lever at the side of the machine and may be stopped and started at will.

The standard in the center of the tub is hot galvanized and will not rust. On this standard is mounted the disc and dolly support, which is also galvanized. This standard is held in place by four galvanized bolts, which run through the bottom of the tub and fasten to a plate 18" long underneath the tub. This makes it possible, by tightening the bolts to insure a water-tight joint and also keeps the standard in a vertical position in the center of the tub.

SWINGING WRINGER—One of the important and attractive features about this machine No. D4, are cut on opposite side, is the four-position swinging reversible wringer, as it enables the operator to do all the wringing by power [illegible] wringer. The clothes may be wrung from a soaking tub into the washer, from the [illegible] tub, then into the bluing tub and from there into the basket. The wringer [illegible] two operations while the machine is washing another tubful of clothes.

This wringer may be used in [illegible] tubs, as it is high enough to swing over tubs of this kind.

THE WRINGER—The wringer [illegible] and steel standard which swings and locks into four different positions. [illegible] grade wood frame, best enclosed cog type, with highest grade rolls, having [illegible] top, which with slight pressure will release the rolls instantly, also having [illegible] of wringer shaft roll which will eliminate all shaft breakage which might occ[illegible] driven. Extra large reversible water-board. It may be operated either forward or reverse or stopped instantly, by a controlling lever conveniently placed at the top of the wringer.

FRAME CONSTRUCTION—The frame which supports the tub and wringer mechanism is constructed of angle steel securely braced, and is light, strong and rigid. The frame is 24" wide and 27" long.

DRIVING MECHANISM—The iron frame, which holds the mechanism for driving the tub and wringer has all the bearings cast in one piece, so there is no chance for them to get out of alignment and cause wear. This iron frame is securely bolted to the steel frame of the machine. The machine is back geared 6 to 1, and a 10" drive pulley is furnished, which should be operated about 200 R.P.M., *but not faster. This is important.* We can furnish 8", 10", 12", 14", or 15" pulleys to fit this washer, on special order.

All gears on the machines are enclosed in injury-proof cases, and the machine is full shaft driven. There are no chains nor belts on the wringer. All driving mechanism is on the opposite side from where the operator stands when using the machine.

ELECTRIC EQUIPMENT—The motor furnished with this machine is of the very highest grade, and is designed expressly for the purpose. It is ¼ H.P., and powerful enough to operate the washer and wringer at the same time under full load. Motor is mounted on an insulated block which is bolted to the steel frame of the machine. The drive shaft is fitted with a grooved pulley which is driven by a V-type belt from the motor. Ten feet of waterproof reinforced cord with plug to attach to electric light socket is furnished.

This machine with the elimination of the motor and equipped with a flat faced pulley, may also be run with engine power, as washer No. D3.

COST OF OPERATING ELECTRIC WASHER—Is about two cents per hour. For a family of six people this will amount to about three cents a week for current to operate both washer and wringer.

SHIPPING WEIGHT of the Electric Washer crated, is about 220 pounds.

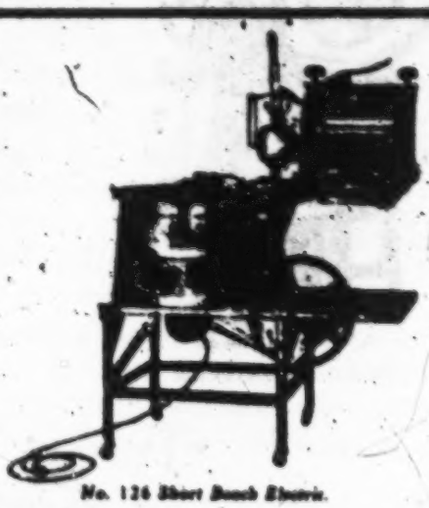
PLAINTIFF'S EXHIBIT No. 40

KING

Electric & Power Washers

Construction

The King machine is designed for simplicity and endurance. Only the best materials are used. Tub is of Selected Louisiana Cypress. Frame is of angle steel, machine riveted and substantially braced. High grade steel shafting used throughout. All gears and castings are accurately machined, making the washer operate easily and quietly. Parts are all standardized and interchangeable. Assembled by skilled workmen and rigidly inspected before packing.



No. 126 Short Bench Electric.

No. 130 Long Bench Electric.

Washing Principle

All King washers are of the dolly type, which principle has proven very satisfactory for quick and thorough work. Dolly automatically adjusts itself to the amount of clothes in the tub. No post in center of dolly to catch and tear the clothing. Cleanses the finest fabrics without injury.

King Washing Machine Company

Manufacturers

Wolcott, Indiana

1 53

Strong and Durable

No. 119 Short Leg Electric

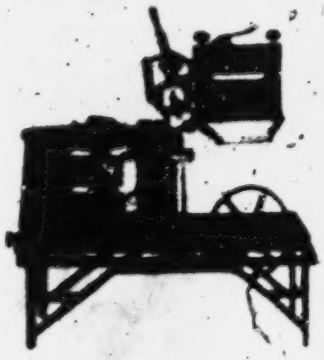
Wringer

The wringer is securely mounted and rigid, of best material, large and roomy. Swings and reverses, operates in any position. Control lever conveniently placed on wringer itself, within easy reach of operator. So designed that it reverses easily under full load.

Instant wringer release assures full protection to operator.

Tub

The tub is of selected Louisiana cypress, kiln dried, sides and bottom corrugated. Finely shellaced and varnished. No bolts in tub to wear loose and cause leakage. Equipped with iron faucet to which hose can be attached.



No. 110 Long Bench Gas Power

No. 115 Twin Tub Electric

Safety

Safety is a special feature of the King Washer. No moving parts are exposed. All gears are properly housed and protected. A slight movement of starting lever stops the machine instantly. Wringer provided with instant release.

Simple and Easy to Operate

No. 110 Short Bench Gas Power

Ease of Operation

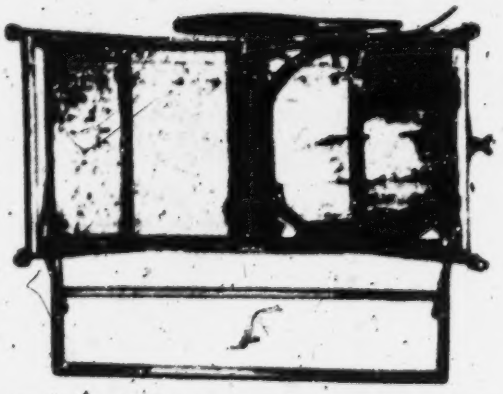
A child can operate the King. A slight touch of the lever starts or stops the tub. Dolly operation stops automatically when lid is raised. Handy knob allows dolly to be raised while in motion, which gives a new grip on the clothing.

The wringer lever is made to give a large amount of leverage with a slight pressure. This makes it easy to reverse the wringer under full load.

Twin tubs can be operated separately or both at the same time.

Simplicity

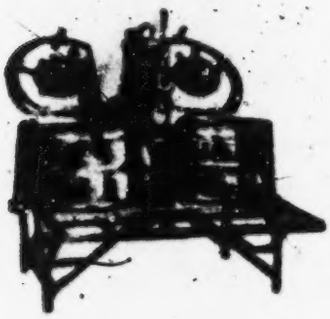
The King construction of only one drive shaft with eccentric attachment does away with useless, troublesome gears. Only two gears are used in the driving mechanism. A simple lever control takes the place of weak and complicated clutches. A three-in-one wringer control completes the operating mechanism.



Bottom view showing simple mechanism, and the only two driving gears.

1 54

Built For Service



111 Twin Tub Gas Power

Equipment

Electric machines equipped with ½ Hp. motors of standard make. Twin Tub machines equipped with ¾ Hp. motors. All motors are guaranteed by the manufacturer against all defects for one year after purchase of machine. Service card and guarantee attached to each motor.

Special type motors furnished when required.

Power machines have a two speed arrangement, making them suitable for any type engine. Equipped with 16" flat pulley 2½" face.

Rub Board Dolly can be furnished on any style machine.

From start to finish the King Washer is built for long-lasting and satisfactory service. Simple and easy to operate, efficient in its work, the King becomes a necessity in every home where washing is done.

Guarantee

Every King Washer is guaranteed against all defects in material and workmanship, providing machine is given proper care and usage.

For sale by

BLUFFTON MFG CO

Manufacturers of High Grade Washing Machines

BLUFFTON OHIO U S A

Page Tightly Bound

Woman's Friend Power Washer

IT COMES TO BE A JOY AND BOON,
It does not come a day to soon;
It brings to woman's woes an end—
The Power Washer, Woman's Friend.

It is the handiest washer out;
It's what all women talk about;
No more o'er washboards need they bend
If they have got the Woman's Friend.

It is so kindly in its ways
It takes the dread of washing days,
You only merely superintend
With cheery smiles the Woman's Friend.

It is the thing the age demands;
It takes the work from Woman's hands,
And very little time they spend
In washing with the Woman's Friend.

It's just as clever as can be,
It's washing done by Science, See?
Of all the washers that they vend
The easiest is the Woman's Friend.

It's the label hopeful bless your souls,
It wrings the clothes with rubber rolls;
There's nothing that you have to mend,
After you wash with the Woman's Friend.

It is a little laundry plant,
The very finest that's extant;
Washing and wringing in one blend,
All parts right there in the Woman's Friend.

It's made home washings now the fad;
It is the washer that makes you glad,
Blue Monday far away will wend,
Bright Monday comes with the Woman's Friend.

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FOR SALE

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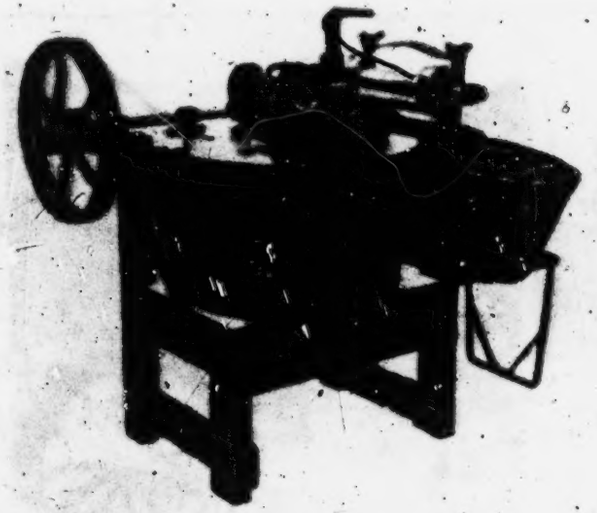
PLAINTIFF'S EXHIBIT No. 41

53

Woman's Friend No. 1

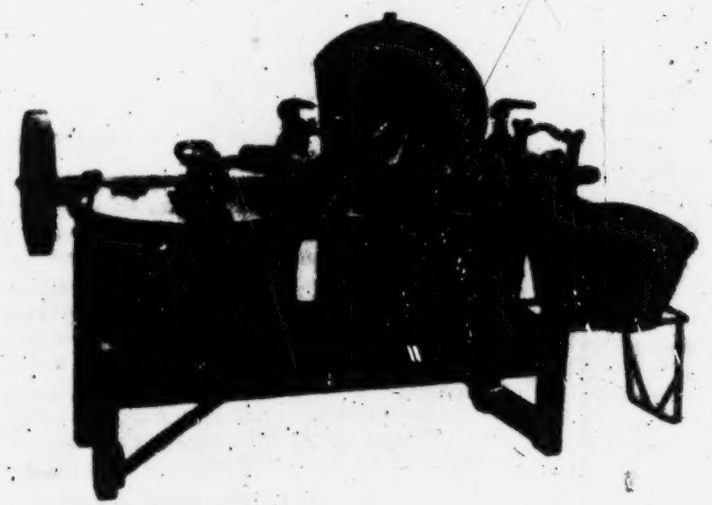


Making Wash Day Pleasant

IF you are doing your weekly washing by the old tub and board method or even with a hand power washer you naturally have a dread of wash day. You put in several hours of hard work and expose yourself to danger of sickness, and when the washing is finally done you are all worn out and exhausted.

But what a difference when you have a Woman's Friend Power Washer. You no longer dread to see the day come, but you really enjoy it. You know that you can fill the big tub full of clothes, push the lever, and the work is being done much better and quicker than you could do it any other way. Not only does the Woman's Friend relieve you of all the hard work of wash day, but while the machine is doing the work you are able to look after your other household duties.

Woman's Friend No. 2 Twin



MAKES wash day a day of pleasure.

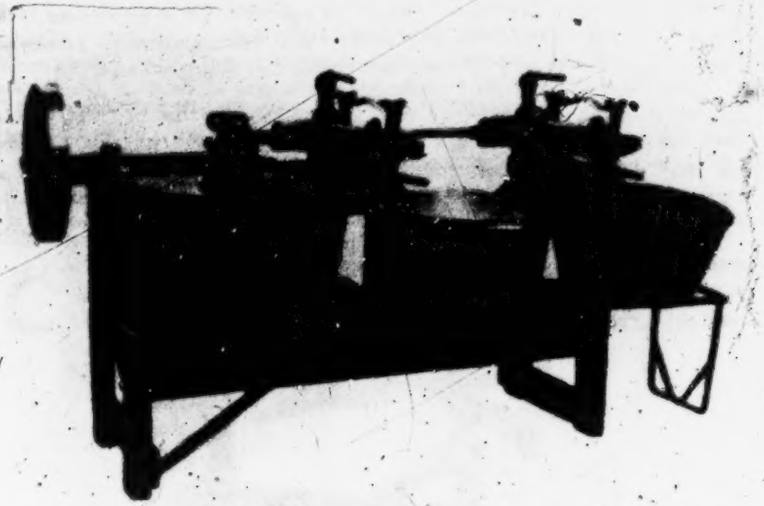
Saves you hours of time and labor. Washes and wrings the clothes. Does everything but hang them up.

There is no drudgery in wash day when you have a Woman's Friend Power Washer. It relieves you of all that disagreeable toil and hard work. Let the Woman's Friend do the washing for you and the clothes will be on the line by nine, snow white, and neighbors will wonder how you do it.

The above illustration shows the Woman's Friend No. 2 Twin, the most advanced type of power washer on the market today.

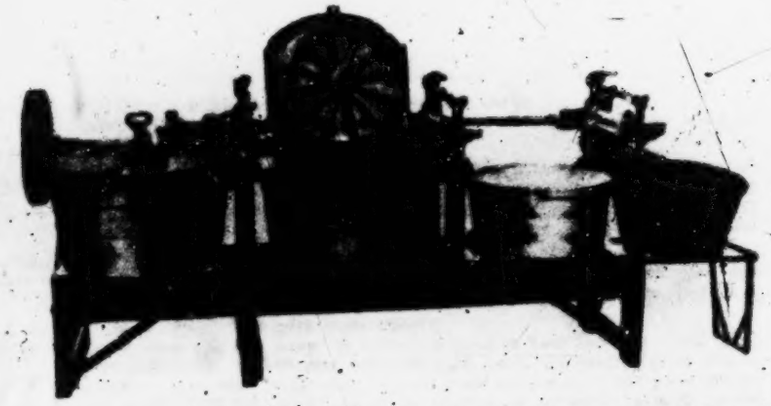
Notice the large, round rubbing board. This rests upon the clothes and as it turns back and forth it not only rubs them as though you had them on the washboard, but it turns them over and over and forces the hot, soapy water through every part, thus washing them perfectly clean in a remarkably short space of time. The rubbing board adjusts itself to the amount of clothes in the machine and will wash one or a dozen pieces equally well, and will not injure the finest fabric.

Woman's Friend No. 2



YOU will notice of course, that all the Woman's Friend Washers are built with the small end of the tub down. This enables you to do a small washing with less water, gives you a better rubbing surface against the side of the tub and affords a larger opening at the top which is a great advantage when you wish to get at the clothes in the machine. The tubs that we use on these machines are all the same size. They are 21 inches wide at the bottom, 24 inches at the top and 12½ inches deep, inside measurement. All our tubs are made of genuine white cedar, which is the best wood that grows for this purpose. It is just as durable as cypress and will not splinter or sliver like cypress does when it gets wet. All tubs are corrugated on the inside and the staves are full 1¼ inches thick, which is much heavier than the average tub, which is only ¾ inch or ⅞ inch at the most.

Woman's Friend No. 3



ALL of the Woman's Friend Power Washers and wringers are shaft and gear driven just like the up-to-date automobile. Belts and chains on a power washer will soon be a thing of the past just like it is on the automobile. Belts will slip and tear and cause you more or less trouble and chains are very little better. There is very little machinery about these machines as we believe in making them just as simple as possible, but what there is, is not under the machine where it is hard to get at and where you will neglect to look after it and oil it, for all machinery must be oiled frequently. All of the machinery is in plain view all of the time and where it is handy to get at, but all gears are covered so that you are fully protected. In all of our experience we have never heard of a single case where anyone has been injured in using one of our machines.

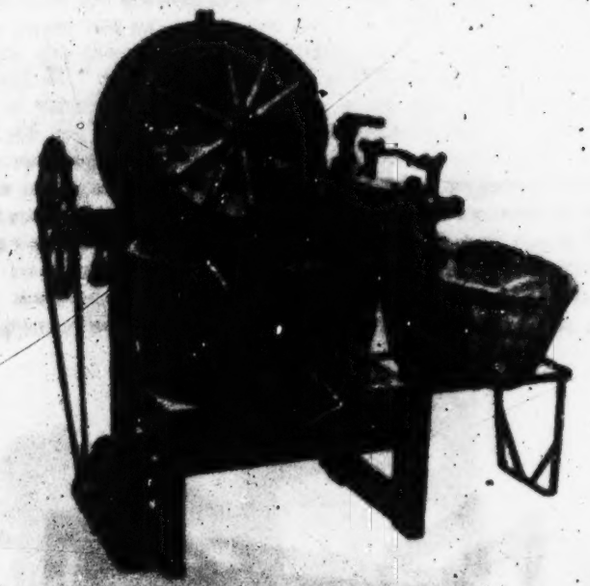
You have observed of course that we do not aim to shift or swing the wringers. Our first machines were built with a movable wringer and was not satisfactory to us. Our wringers are all bolted to a stationary frame and it is not necessary to shift them every time you wish to use them. Our Woman's Friend No. 2, which has two wringers, does not cost you any more than any other machine of the same capacity with one wringer, and by using two wringers instead of only one you not only avoid the shifting, but two wringers will last twice as long as one will and the second wringer is always nice and clean for the last wringing.

The lever that you see right above the wringer within easy reach will start, stop and reverse them instantly.

The frame is made of solid, well-seasoned, hard lumber mortised and bolted together.

Each tub is provided with a large drain faucet that goes into the tub from the bottom so that the water will all drain out.

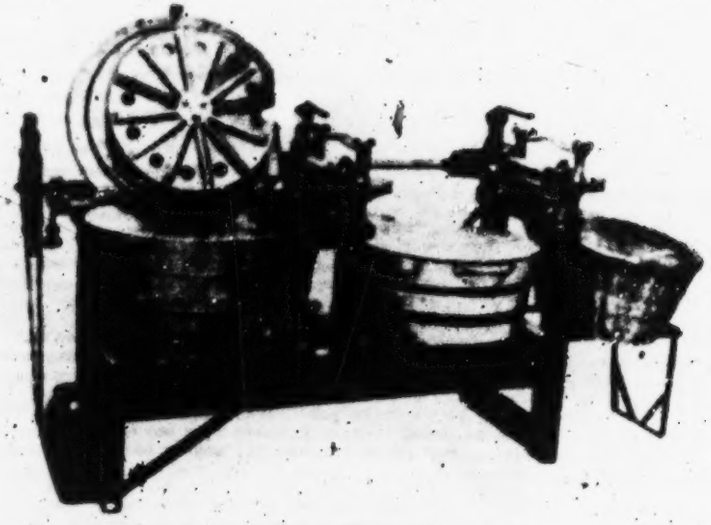
Woman's Friend Electric No. 1



THE Woman's Friend Washers can easily be equipped with electric motors for use where current is available. We equip all machines with a very high grade one-fourth horse power waterproof Hamman Motor built especially for the purpose.

Once you have the electric switch on the first tub full of clothes in a Woman's Friend Electric Washer and see the results, you will regret that you have been without this mechanical servant so long. And when you see how beautifully and white and spotlessly clean the clothes are washed in just a few minutes, your wonder will turn to amazement. And all this without a bit of exertion on your part. The Woman's Friend Electric takes care of all the hard work. It not only does all the washing, but it does all the wringing as well, without taxing your strength in the least and all it will cost you on an average is 5c per washing.

Woman's Friend Electric No. 2



To the Housewife

WHETHER you live in the city, town or country, have servants or do your own work, you cannot afford to be without a Woman's Friend Power Washer. It is easy to get and to keep a good servant if you have one of these machines. If you hire your washing done at a cost of from one to three dollars a week and the work is unsatisfactory to you, you can avoid it all by having one of these up-to-date labor savers.

Washing is beyond all doubt the most disagreeable part of all your labors if done in the old fashioned way, and why should you continue to cling to this obsolete method of washing clothes when everybody is getting away from it.

The Woman's Friend does the wringing as well as the washing, and did you ever stop to think how many times you wring the clothes, four as a rule, from the suds into the water, then to the rinse, from there to the bluing water, and out of the bluing water into the basket, and the Woman's Friend does it all without the least bit of complaining.

No time is lost when washing with a Woman's Friend, as you can work in the rinse or bluing tub while another batch is being washed.

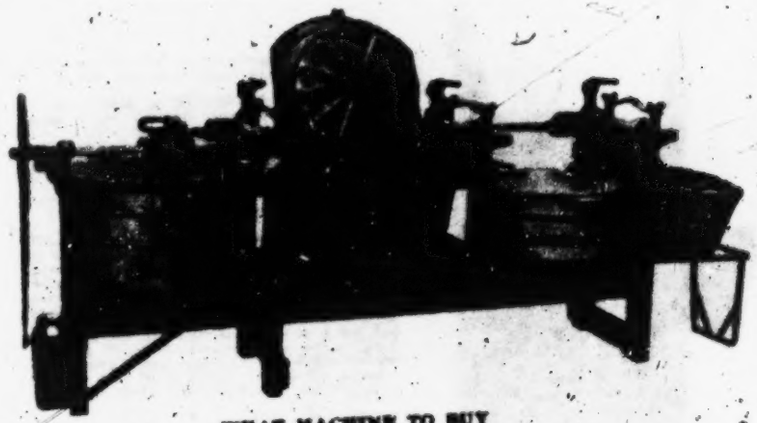
Everybody else envelops labor saving machinery, in the office, factory, shop and farm, no matter where or what it is. Your time is worth just as much to your family as the man's time is to his work or business, and your health is worth more to you than all the money in the world, so why do you not take advantage of these things before it is too late.

Woman's Friend Electric No. 2 Twin

INSTEAD of making a half day or all-day washing, why not make it a wash hour and thus convert dread into pleasure. Worry and overwork robs the complexion of its freshness, brings little care lines and crow's feet to the face; streaks the hair with gray and brings age before its time. Why endanger your health by bending over a tub of unhealthy, steaming water when a Woman's Friend Power Washer will end it all?

It is needless to say more, you know that all that has been said is true, but for some reason or other you have been putting it off. Perhaps you have been undecided as to which machine to buy and if such has been the case we feel sure that you now realize the Woman's Friend is the one you have been looking for and that is will be your choice.

Woman's Friend Electric No. 3



WHAT MACHINE TO BUY

THE Woman's Friend is made in four styles. The No. 1 has but one wringer, but is used extensively where washings are not large and where there is but little space to keep it.

The No. 2 is one of our best sellers. This machine as you will observe, has two wringers. The clothes are put into the main wash tub where they get their first washing, after which they are taken through the first wringer into the rinse tub, then if they are colored clothes they pass through the second wringer into the clothes basket. If they are white clothes they pass through the second wringer into the blue water, then lay a board across the second or rinse water tub and squeeze the wringer, and wring out of the blue water upon the board when they are ready for the line. By using two wringers instead of only one you will quickly see that the second wringer is always sure and clean for the last wringing. By this arrangement you can keep the first tub working all of the time while you are working in the rinse or blue water.

The No. 2 Twin and No. 3 are rapidly becoming very popular with those who have large washings and wish to do the work as quickly as possible and who wish to wash the clothes a second time, which is getting to be very common. After the clothes go through the first washing in the first tub they pass through the wringer into the second tub for a second washing and then they are taken through the second wringer into the rinse or blue water, as the case may be where they pass through the third wringer into the clothes basket. These are beyond all doubt the most complete washers on the marks today and wherever they are introduced become very popular.

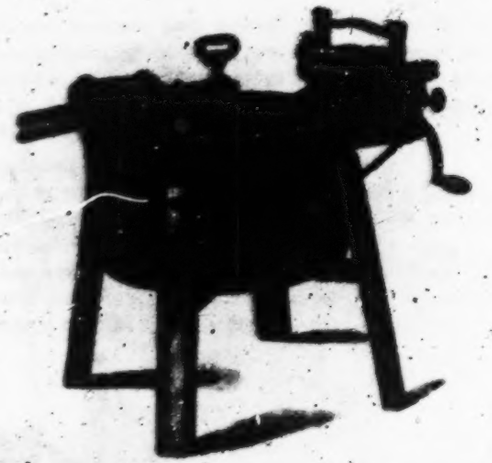
Dimensions

	No. 1	No. 2	No. 2 Twin	No. 3
Length over all	54 in.	53 in.	88 in.	112 in.
Width over all	34 in.	34 in.	34 in.	34 in.
Height over all	42 in.	42 in.	42 in.	42 in.
Weight crated	240 lbs.	320 lbs.	400 lbs.	515 lbs.

Diameter of belt pulley 18 inches, face 2 inches, speed 105 revolutions per minute.

Rinse tub and clothes basket are not included with the machine unless mentioned and charged for extra.

Ideal Water Power Washer



THE Ideal Water Power Washer is the same machine as our Ideal Hand Power Washer shown on another page.

The Tub is made of Cedar, is corrugated on the inside and is extra large, being 21 inches wide at the bottom, 24 inches at the top and 15½ inches, deep, all inside measurements. The legs and cross pieces are made of hard wood and are bolted to the machine so that they never can work loose or break with ordinary care.

However, the one important thing that we want to call your attention to is the Water Motor. The cylinder is extra large and is made of solid seamless brass tubing, and is inserted into a heavy iron shell or frame so that it cannot be injured from the outside. There are no coil springs on the inside of the motor to get out of fix and cause trouble. If you have tried other water motors and have had trouble, do not for a moment think that all motors are alike in that respect as they are not. We absolutely guarantee every motor in every respect for one year, and if you have the least bit of trouble during that time ship it back to us at our expense and we will repair it gratis or give you a new one in exchange.

Ideal Hand Washer

MANY people for various reasons cannot afford a power washer and yet would like to own one of the celebrated Ideal Power Washers. Hence the question of the lady of the machine in charge of this magic lever has said many a "The Washer is running hard and fast in a few and very unsteady when does not have the operator on the floor. In the construction of this machine we have eliminated all of the complex and complicated parts however we do not avoid them.

Points to Remember

1. It runs so easily that a child 10 years old can operate it.
2. It is almost noiseless.
3. It has a strong right fit.
4. It will wash one of those plain quickly and
5. It will not injure the most delicate fabric.
6. It will wash a tub full of clothes in five minutes.

THE Ideal Hand Power Washer is equipped with the latest model Ball Bearing Wringer. This wringer rolls the clothes out of the water and through the rolls dry as it can be done by hand. The rolls are of pure rubber and will not mark the clothes. The wringer can be adjusted to any thickness of clothes, so that heavy articles will not be damaged in the least. The wringer can be turned to any position desired, so that it will discharge the clothes on either side of the machine. The wringer can be removed in a moment's time, and when not in use can be folded down out of the way, thus giving you a full space to get at the machine.

The machine runs easily, smoothly and quietly, and the speed of washing can be regulated to suit the operator. The Ideal Hand Power Washer is the result of years of experience in the manufacture of washing machines, and we believe it to be the best machine on the market.

In the construction of all of our machines we use the best material that can be obtained, and every part is made to fit perfectly. This accounts for the ease with which the machine is run and the long time it will last.

The legs and cross pieces are made of hard wood, thoroughly seasoned and bolted together.

The handle or crank that operates the rubber is forged from one solid piece of cold rolled steel. Can you imagine a more durable machine?

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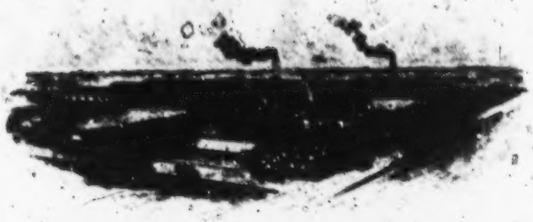
PLAINTIFF'S EXHIBIT No. 42



The Home of Your Friend

Quickest Easiest and Cleanest

BARLOW & SEELIG MFG. CO.

BARON, WISCONSIN

Gentlemen:

This brings to you one of the most important announcements ever made in the washing machine industry.

It introduces the new Big 3 "Speed King" gyrator--a machine that has proved by rigid practical tests to be the fastest, smoothest-running washer in the field today.

For beauty it is unequalled. Feature for feature it will outpoint any other washer made. It was built with that purpose definitely in mind.

The "Speed King" represents the peak of modern washing machine development.

Since it will take our salesmen from four to six weeks to cover their territories, it will be to your advantage to mail back the enclosed card for full particulars regarding the Big 3 "Speed King" franchise. Upon receiving the card, our salesman will be notified to call and demonstrate the new machine to you.

He will outline in detail the big newspaper and direct mail campaigns we have prepared to help Big 3 dealers push the sale of "Speed King" washers. These advertising campaigns will be furnished free of charge.

This new "Speed King" is every inch a superior washing machine, and only such dealers will be granted franchises who thoroughly satisfy us that they are going to PUSH its sale to the limit. The first card from each community will naturally receive first consideration.

Look over the illustrations and facts inside. Then check and mail the enclosed card. It's already stamped.

Yours very truly,

BARLOW & SEELIG MFG. CO.

Chas. D Stone

Sales Manager.

P. S. You'll be surprised at the unusual discounts our salesman will quote you.

BARLOW & SEELIG MFG. CO.
Ripon, Wisconsin

Mothers over age guaranteed

It's ready!

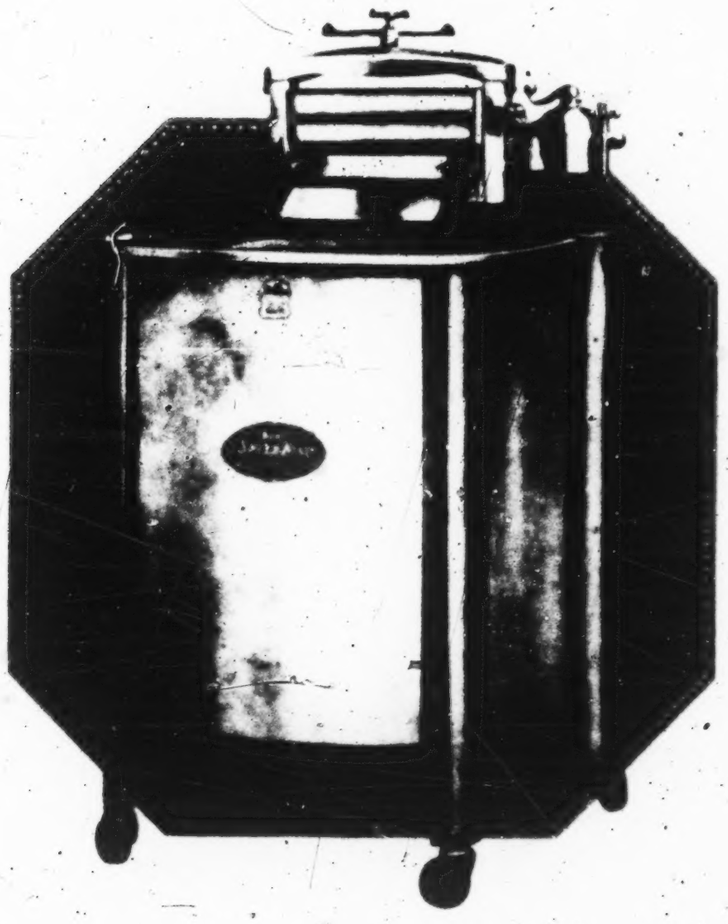
the new Big 3

"SPEED KING"

Maytag Chicago Co.
Chicago, Ill.

This New Big 3 "SPEED KING"

answers the present day demand for quicker and cleaner washing



HERE it is—after nearly a year of rigid testing and careful perfecting—a machine that thoroughly answers the modern demand for quicker, cleaner and easier washing.

And isn't it a beauty! The long grey panels inclosing the entire mechanism and the brightly polished, udylited, nickel wringer give it a distinctive, "custom" appearance that will quickly win the admiration of every woman.

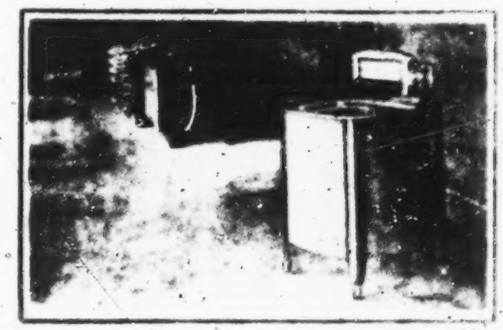
Then, on lifting the cover, the housewife finds that it is the popular agitator type—the type that she knows will do her washing in the least possible time. Instantly she will "fall in love" with the new "Speed King".

You will, too, as soon as you have noted the features shown inside.

5040 hours of continuous running

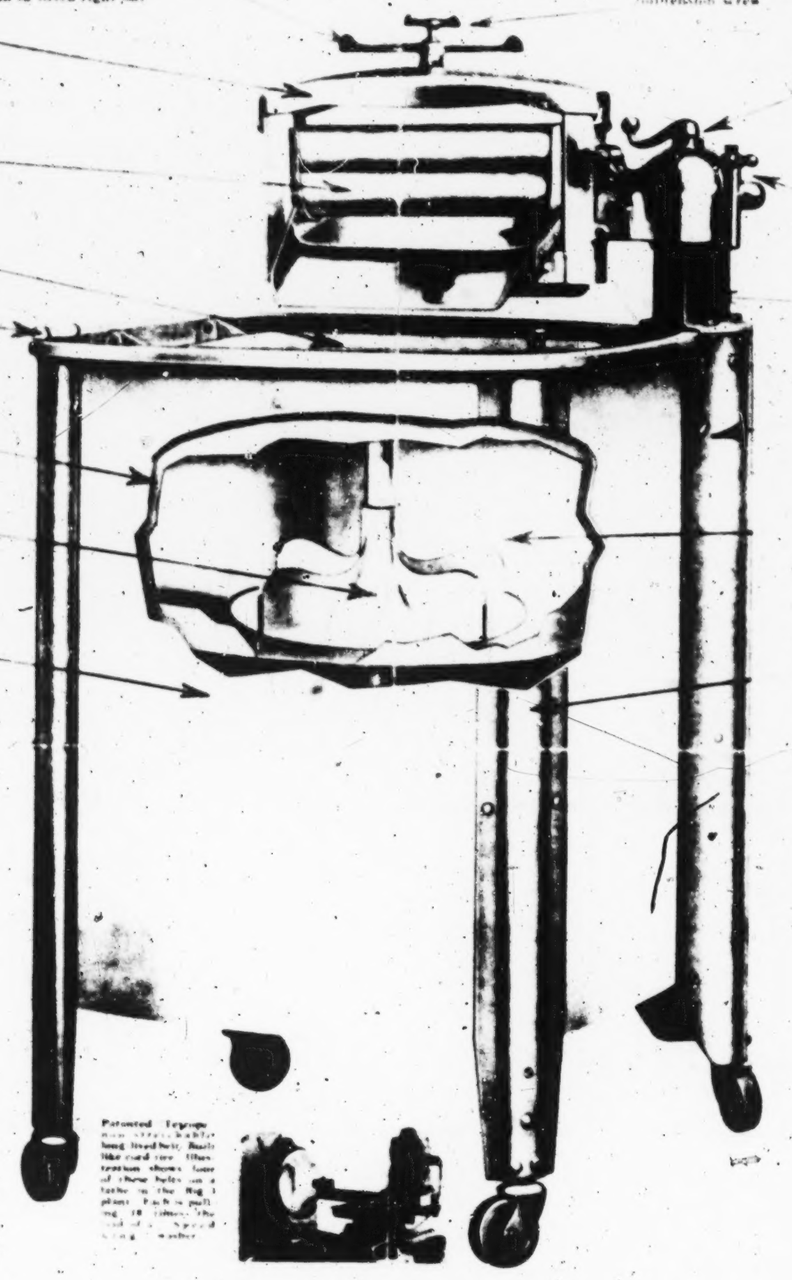
—equal to 100 years of ordinary wear

On December 11, 1928, the first model of the "Speed King" was completed. On that day it was filled with water and started in full motion. It has been running continuously 24 hours a day ever since. The time it has been running, over 5040 hours, is equivalent to almost 100 years of actual washing hours in an ordinary [illegible]. This is conclusive proof that the "Speed King" is mechanically perfect in every respect and will give decades of uninterrupted service.



These "SPEED KING" Features

will help sell more washing machines for you



Positive, rust proof, ball-bearing, nickel-plated wringer

Semi-balloon, long lived wringer rolls. Easy on buttons

Hinged lid, when open, serves to hold clothes while sorting

Clutch lever to start and stop agitator, conveniently located and simple to operate. Clothes can be put in or taken out while machine is running

Dead air space between tub and outside panels serves as insulator to retain heat

Cast aluminum four vane agitator with smooth, highly polished surface. Is driven by spline fitting instead of square shaft. No possibility of noise developing. Shape of agitator designed to produce maximum water action

Tight, removable panels entirely enclose washer. Not only keeps water hot, but also keeps children from getting their fingers into moving parts. Prevents dirt from getting into mechanism

Specially designed double valve, brass proof faucet. Quick draining

Adjustable leg to make washer stand solidly on uneven floor

All mechanism is made of the very high st grade materials. Its operation is the quietest and smoothest of any machine made. To eliminate friction, spiral bevel transmission gears are used instead of worm reduction. This construction requires no adjustment and consumes less current. Durex self-oiling bearings are used on all moving parts, no oiling necessary

160 wringer, roll release. Rolls can be lifted right out

Easy and positive wringer roll tension screw

Patented sliding gear arrangement for reversing wringer. Makes for ease of operation and extreme long life. Polished alum num, die cast housing with convenient shift lever

Wringer lock lever allows wringer to be swung and locked in ANY position. Easily and quickly operated

Wringer post of correct height to clear stationary tub

Handy Switch to start and stop motor. Is in waterproof housing to prevent short circuiting

Heavy, rounded bottom, nickel plated copper tub. Will last a lifetime, easy to keep clean. No water line. Sides are square with rounded corners. Small or large batch of clothes can be washed

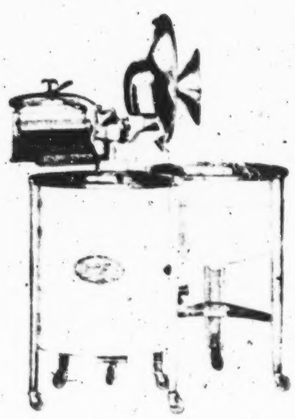
Beautiful and substantial all-steel body construction. Compactly built to go through narrow doorway.

High grade H. P. motor capable of large overload. Can also be furnished with air-cooled gasoline engine

Motor base support made of wood to eliminate noise and vibration

Special, large, high grade casters supported by specially designed malleable iron caster sockets made for easy moving of washer.

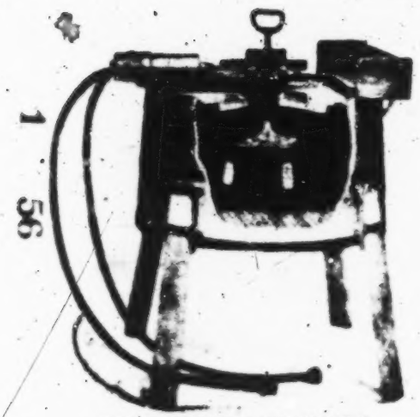
Patented Tripod... [illegible] long lived belt. Reels like card tape. Illustration shows four of these belts on a [illegible] plant. Each is pulling 10 times the load of a [illegible] washer



"Big 3" dealers can *now* offer both vacuum and gyrator types

A [illegible] the new "Speed King" [illegible] the lead in Big [illegible] ... [illegible] ... [illegible] ...

PLAINTIFF'S EXHIBIT No. 43



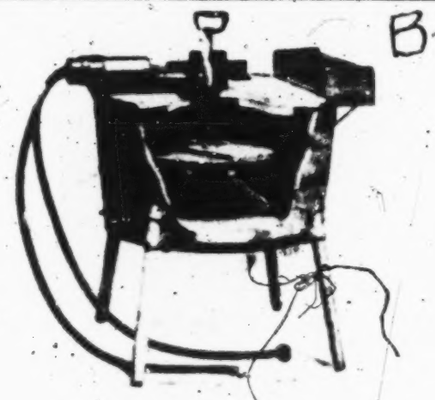
BOSS MOTOR WASHER

Motor Vertical cartridge pattern type. Has all the good points of the spring-neck type mechanism with none of their disadvantages being a straight unit construction of new refinements where engineering research proved to be good. Will operate heavily as well as light or new machines. Instead of being fastened to frame work at each corner of the platform is raised and gently rocked by the single spring which is placed and made that it can never break or require attention. Constructed of brass and bronze throughout. Has heavy cast brass [illegible] bearings, having double bearing for motor shaft and brass guide for piston, perforated cylinder which must be taken apart to keep dirt out of motor. Handle to dasher post to remove dasher from machine before opening and losing lid. Dasher adjusts through top of motor by projection through or to the bottom. Galvanized hardware and rust proof.

Equipment Motor complete as described with high grade intake and exhaust hose. Large cypress tub, natural finish with reinforced top corrugations, loader detachable lid hooked. Wringer attachment detachable hardwood legs as shown or metal legs when so ordered galvanized hardware and castings.

ONE SIZE ONLY

Capacity 5 shirts Shipping Weight 80 lbs



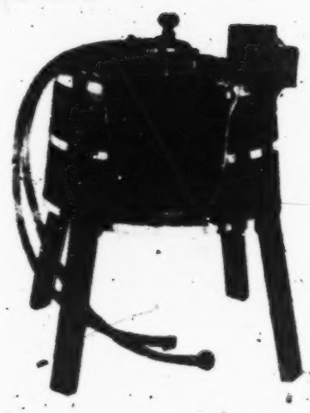
VERIBEST MOTOR WASHER

Distinctive Features The Veribest is a departure from the peg dasher type motor washers having the long flat rub board dasher which in comparison to the peg type dasher is that most only agitators all the [illegible] the very small is next to the larger pieces but [illegible] alternate rotary motion and pressure of the wash water washes quickly and thoroughly on the [illegible] suction agitation principle. It is fully [illegible] the name implies the VERIBEST. Dasher shaft adjusts through top of motor the projection through or below the dasher. Handle on dasher shaft to remove dasher from machine before opening and losing lid.

Equipment Motor complete as described with high grade intake and exhaust hose. Large cypress tub natural finish with large open top detachable lid corrugations on inside locked wringer attachment detachable hardwood legs galvanized hardware and castings.

ONE SIZE ONLY

Capacity 5 shirts Shipping Weight 70 lbs



BANNER MOTOR WASHER

Motor Constructed on the turbine principle of direct action no gears or belts only two self lubricating bearings only two well protected and practically indestructible springs heavy cast bronze cylinder and parts perfectly machined perforated metal screen before intake port to prevent anything getting into the cylinder. Motor sets on solid one piece bracket. Convenient iron water stand most washer motors and will operate on very low pressure. Dasher post adjusts through top of motor by projection below dasher.

Equipment Motor complete with extra long high grade intake and exhaust hose with threaded coupling on intake and weight on exhaust hose. Large cypress tub, natural finish with reinforced top corrugations on inside cypress locker detachable lid hooked. Wringer attachment detachable hardwood legs as shown or solid legs when so ordered galvanized hardware and castings.

ONE SIZE ONLY

Capacity 5 shirts Shipping Weight 80 lbs

BOSS
Washing Machines

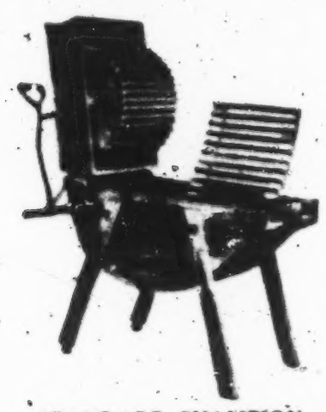
For HAND, WATER, ELECTRIC and ENGINE POWER.

"THE STANDARD EVERYWHERE"

Exh #43

The Boss Washing Machine Company

Cincinnati, Ohio



STANDARD CHAMPION

Construction and Operation Constructed on the rubbing motion principle the upper cylinder swell being while the lower rub board remains stationary the clothes being placed between. Operated by drawing the operating lever back and forth with one or two hands. Single handle on operating lever to produce additional pressure when washing clothes badly soiled.

Distinctive Features Self adjusting upper cylinder rubber strip between rub board large capacity ease of operation large solid wringer attachment rollers on legs. Operating mechanism simple and non breakable.

Material Body cypress. Louisiana Red Cypress Natural Finish. Heavy galvanized iron bottom. Galvanized hardware and cast legs.

MADE IN THREE SIZES

		Capacity	Ship Wt
No 1	Small family	10 shirts	85 lbs
No 2	Ordinary family	15 shirts	95 lbs
No 3	Large family hotels and institutions	18 shirts	90 lbs

STANDARD PERFECTION

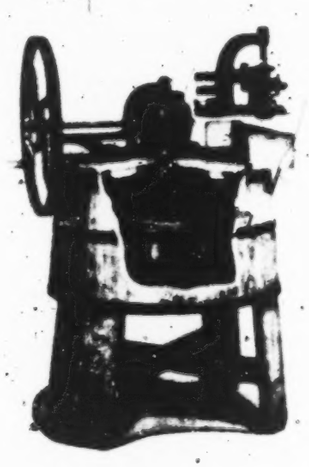
Construction and Operation Is operated by drawing the handle back and forth and constructed on the same principle as the Standard Champion, but has no cover. Being made of cypress, Louisiana Red Cypress, natural finish it is far superior to the ordinary open washers that are generally made of common wood and painted.

Distinctive Features Self adjusting cylinder made only with ball rod which holds cylinder in position, shown above when machine is even draining water back into tub. The superior square edge rubbing strips insure quick and perfect results and do not merely glide over the clothes with little effort, as rounded strips do. Lower rub board is strongly made and is removable. Solid wringer attachment.

Material Close Louisiana Red Cypress, body natural finish. Also Cypress Cylinder and rub board. Heavy galvanized iron bottom. Galvanized hardware and castings. Non breakable ball rod and malleable castings.

ONE SIZE ONLY

Capacity, six shirts Shipping Weight, 65 lbs



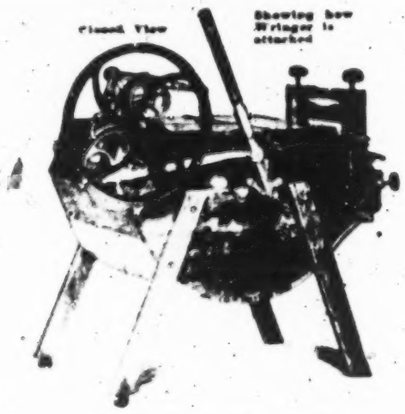
BANNER ROTARY

Construction Operation Has simple roller bearing gear driven by large heavy flywheel thus eliminating friction and wear and insuring smooth and easy running. Swinging imparts an alternate rotary motion to the dasher at a high speed to produce proper agitation in the tub.

Distinctive Features Covered gears. Telescopic dasher post no projection below dasher to tangle or injure the clothes. Non floating Cypress dasher. Large Cypress tub natural finish with reinforced top corrugations on inside detachable lid hooked wringer attachment metal legs as illustrated or four detachable legs when so ordered. Galvanized hardware and castings.

ONE SIZE ONLY

Capacity, 8 shirts Shipping Weight, 85 lbs



BOSS SELF-WORKING

Construction and Operation Is identically the same as the regular [illegible] except it has a reciprocating [illegible] mechanism and is operated by a lever instead of a hand wheel. At every fifth stroke of the lever the dasher makes one revolution and the two cylinders oscillate the force of forward and backward strokes exert against the high speed flywheel thus serving the same purpose as the flywheel in an engine making the machine run smoothly quickly and surprisingly easy with the smallest or largest load. The mechanism is extremely simple in construction the long chrome bearings and the gear wheels are closed inside to prevent accidents. Can be furnished with grooved belt wheel for power drive when so ordered.

MADE IN TWO SIZES

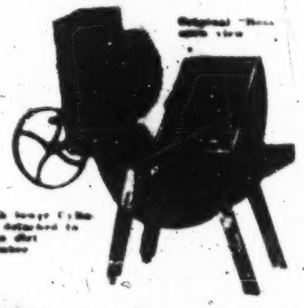
		Capacity	Ship Wt
No 32	Ordinary family	12 shirts	120 lbs
No 35	Large family hotels and institutions	18 shirts	135 lbs

"BOSS" — The Original Double-Cylinder Washer

Over twenty-three years this Famous Washer has maintained its supremacy in over a Million homes, as well as Hotels and Institutions, and to this day is without an equal the acknowledged leader everywhere, because it is easy to operate, simple to use, extremely durable, and above all, a really washes clothes clean

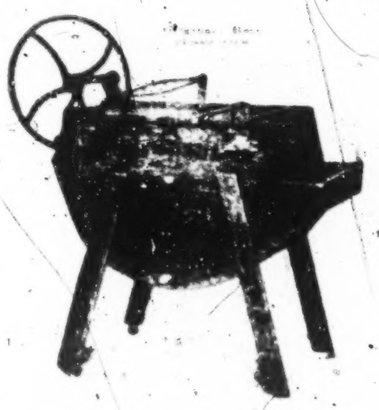
Construction and Operation — The wheel is turned by hand. This puts the two worm elevator rub-bearings into prime, both oscillating simultaneously in opposite directions. The rubber strips placed to cause these progressive & reversing motion cleaning action that nothing fails to dislodge the most soiled garments, quickly and thoroughly

Distinctive Features — Self-draining tapper cylinder; copper dirt collar cylinder; detachable cog hardware—absorbs dirt settling chamber; large pulley; wringer attachment; rubbers on legs



Original "Boss" with tub

With large Cypress dirt deflector to retain dirt chamber

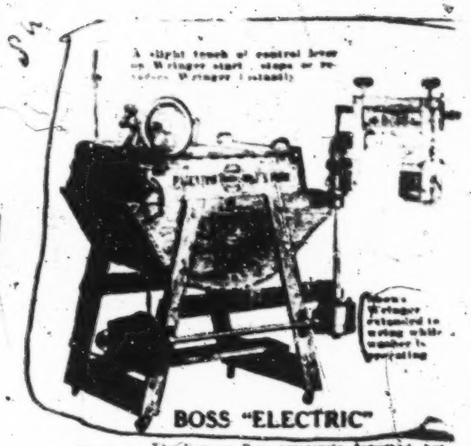


Material — Body of vat [illegible] cypress wood [illegible] and galvanized hardware and castings where required

Important — Where [illegible] will be furnished with [illegible] diameter 16 inches [illegible] With this wheel machine must be operated by [illegible] to an engine or line shaft. When ordering the drive wheel should be about [illegible]

MADE IN THREE SIZES

No. [illegible] Ordinary family	[illegible]	[illegible]
No. [illegible] Large family	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]



A slight touch of control brings the Wringer start, stops or reverses Wringer instantly

Shows Wringer returned to swing while washer is operating

BOSS "ELECTRIC"

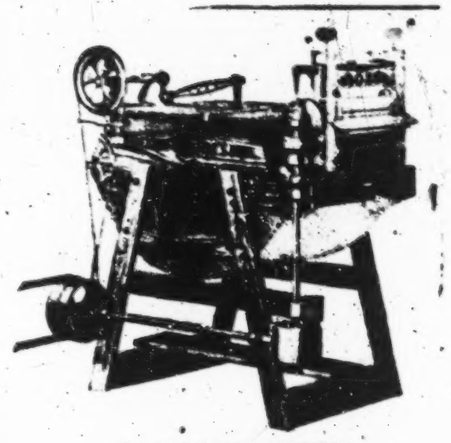
Washer — The famous Boss previously described, but constructed specially built for power drive. Large extra heavy bolted to tub and well braced. Mounted on ball bearing casters. Body of Louisiana Red Cypress, natural finish. Heavy gauge solid copper bottom with metal drain fitted. Machine finishings noiseless in operation. Galvanized castings and hardware.

Wringer — operated by power and safety device which instantly releases pressure on rolls, making it accident proof. Can be swung out as shown to wring while washer is running, operates forward or reverse or remains neutral in any position. The reversible drain board. 12 inch high-oil grade rubber rolls on bowed, rugs, ball bearings.

Motor — High grade Standard make with ample power to operate washer and wringer at same time, with maximum load. Two foot connecting cord and plug attached to fit any standard lamp socket. Motors furnished for any standard current. Kind of current must be fully specified when ordering.

MADE IN TWO SIZES

	Capacity	Ship Wt.
No. [illegible] ordinary family	12 shirts	300 lbs.
No. [illegible] Large family hotels and institutions	15 shirts	325 lbs.



BOSS ENGINE POWER

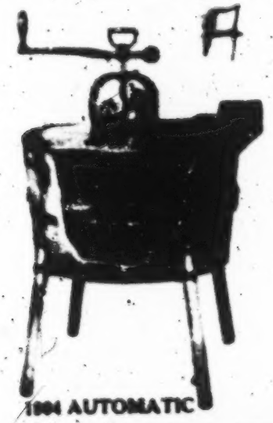
Washer / *Wringer* — This outfit has the same equipment and is identically like the "Boss" Electric except that it is arranged to operate by engine or other light power, by having a tight and loose pulley on the drive shaft instead of the electric motor drive and is not mounted on casters

Pulleys — Diameter six inches, with two inch face. Should be connected to run at a speed of 300 R. P. M., which will run the washer about 90 R. P. M. and the wringer about 45 R. P. M. the proper speed.

Furnished only complete with wringer, as illustrated

MADE IN TWO SIZES

	Capacity	Ship Wt.
No. [illegible] ordinary family	12 shirts	275 lbs.
No. [illegible] Large family hotels and institutions	15 shirts	300 lbs.



1904 AUTOMATIC

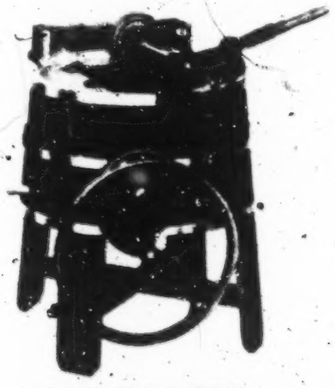
Construction and Operation — Designed to meet the demand for a washing machine combining the important features of the hand rubbing process with a power machine. The machine has a vertical shaft with gears from the top to the bottom. It is operated by pulling the handle forward and back about a quarter turn, which gives the tub on the shaft a rotary motion, first in one direction and then in the other, practically the same principle as used when washing by hand.

Distinctive Features — Automatic attachment makes gasoline power and electricity easy. Large dirt pocket in bottom of tub. Tub is removable. Dirt is forced down on the bottom of the tub, instead of coming to the surface as in hand washing, as the difference between the previous boiler dislodges.

Large Cypress Tub — Natural finish corrugations on inside. Equipped with hose attachment for connecting with hose for automatic water supply. Galvanized hardware and castings

USED OVER ONLY

Capacity, 8 shirts. Shipping Weight, 70 lbs.



CINCY HIGH SPEED

With Fly Wheel for Hand Power

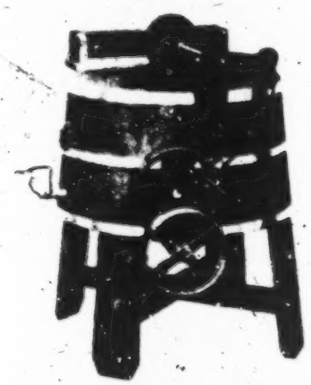
Construction and Operation — A distinctive high speed rotary washer operated by lever with high speed flywheel geared to make 300 revolutions per minute—this terrific movement creating sufficient power to practically run the Washer without exerting the operator

Distinctive Features — Operating handle adjustable to all different positions horizontally—diagonally or vertically permitting the machine to be operated while one is seated or standing. Overhead is [illegible] being wheel which obtain runs in double bearings—eliminating friction and wear to the wheel bearings. Tub always running smooth and light running. No heavy machinery attached to tub. Machine is noiseless in operation.

Large Cypress Tub — Natural finish with reinforced top corrugations on inside—solid copper bolted wringer attachment automatic 16 inch—detachable tub and [illegible] System Gasket. Tub [illegible] Gasket [illegible] and projection below flusher. Galvanized hardware and castings

ONE SIZE ONLY

Capacity, 8 shirts. Shipping Weight, 65 lbs.



CINCY HIGH SPEED

With Pulley for Belt Power

Distinctive Features — This is the Cincy Hand Power Washer with the operating handle and flywheel removed and belt pulley attached. The flywheel and pulley are interchangeable, enabling the hand and engine power washer to run. The operating is as represented that as the pulley is small, the machine can be directly belted to engine or line shaft and can be speed and stopped while running. No shipping of belts or frequent stopping and starting of washer are necessary.

Pulley — Diameter 8 inches with 2½ inch face for belt and groove for power [illegible] It is recommended that customers using the Cincy equipped with the regular flywheel for hand power, also carry some of the pulleys in stock, so that when called for, Pulleys are furnished immediately. A small size Universal machine may be obtained of above equipped with belt pulley instead of the flywheel.

ONE SIZE ONLY

Capacity, 8 shirts. Shipping Weight, 65 lbs.

UNEEDA

A [illegible] Vertical Washer operated by working the handle back and forth which imparts the [illegible] motion to the washer

Distinctive Features — Improved construction, perfect fitting and heavy castings make the greatest possible effort easy to operate and free of the vibration and breakages often experienced with other washers of this type. The rollers guide to hold the dirty out of pockets, also a number of improvements and advantages in covering ease of operation and absolutely free

Large Cypress Tub — Natural finish with reinforced top corrugations on inside large [illegible] detachable bolt-around [illegible] Galvanized steel hardware and castings

ONE SIZE ONLY

Capacity, 8 shirts. Shipping Weight, 65 lbs.

764

True Economy

Wringing the clothes is decidedly the hardest part of washing. thousands of women have been permanently injured by the laborious task of turning a wringer. Many a husband would willingly supply a power washing outfit, but: First, he has not the knowledge of the drudgery of washing; that the doing of one day's washing would give him. Second, women are naturally conservative and will hardly ever willingly give up hand-washing until health fails or some neigobor shows how beautifully a machine does the work, therefore, she does not suggest the need of equipment, but rather the reverse. Third, the husband's attitude is that his wife knows her business and that if machinery were profitable she would ask for it, while all the time she may be practising a false economy with the idea that she is saving her husband.

Princess Facts

The Princess will do the drudgery.

The Princess works just as well on the hot, sultry, killing days.

The Princess will wash anything from the most delicate fabric to the coarsest, heaviest, back-breaking material better than by the hand process.

The Princess has no springs in the motor; it has a positive acting motor, very economical of water. The water cost for a month's washing will not equal the cost of an hours' hand help.

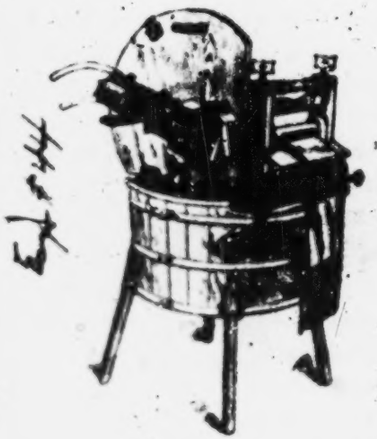
The Princess Wringer is perfect and is guaranteed for three years.

The Princess Mfg. Co.

Pearl and Ludlow Sts. Cincinnati, Ohio

PHONE CANAL 3627

Household Help Question



The Princess Water Power Washer and Wringer

PLAINTIFF'S EXHIBIT No. 44

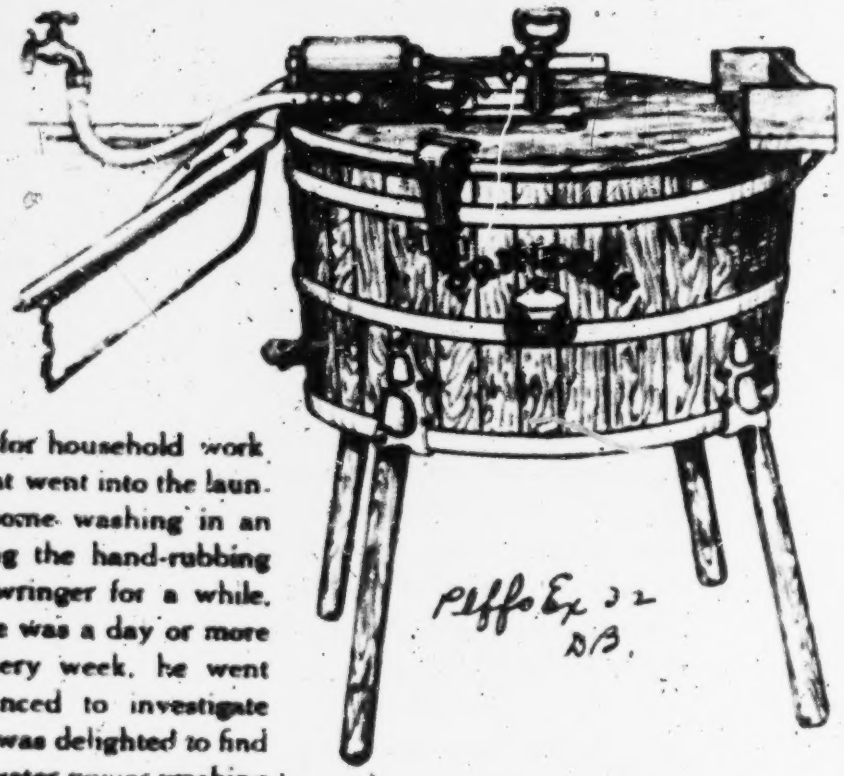
265

567

PRINCESS WATER POWER RUB-BOARD WASHER

NO QUESTION causes more worry in the home and often for the business man there is no worry so constant as the worry caused by his wife's difficulty in handling her help problem. The cause is largely the lack of progressive methods and equipment for household work.

We know a man that went into the laundry to help his wife do some washing in an emergency. After using the hand-rubbing process and turning the wringer for a while, and finding out that there was a day or more of that kind of work every week, he went down town and commenced to investigate washing machines. He was delighted to find that we not only have a water power washing machine that can be run from any water tap, but that we have a wringer that operates successfully when the water pressure is over sixty pounds. He found upon investigation the water pressure, as in most cities was about seventy-five pounds. Both the rubbing and the wringing in that laundry are now being done by our water power machine. Washing is now a pleasure in comparison with what it was and the help question in that home is not now nearly so hard to handle.



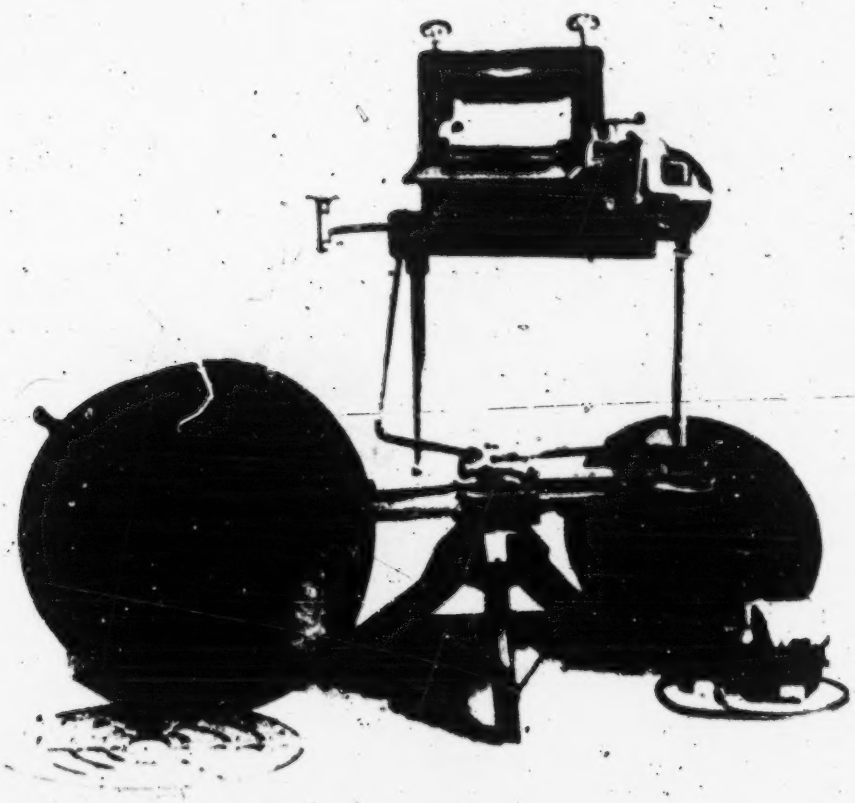
ATTACH TO HYDRANT

Let water do your rubbing even if the water pressure is not enough to do the wringing, this machine will do the washing on 20 lbs. pressure

This machine will pay for itself easily in less than a year in money saving. It will pay for itself much oftener in nerve ease because it helps to solve the help problem—that often means health and happiness. In many cases it avoids the need of hired help; in many more cases it makes the hired help satisfied and much more reliable and permanent because satisfied. The motor is the most powerful and economical on the market. The design of the tub and rubbing surfaces are perfect. Let us show you the machine and explain the superior points of the motor and tub design.

PLAINTIFF'S EXHIBIT No. 45

767



SHOWING THE CONVENIENCE OF MOVING
THE "1900" WASHER

PLAINTIFF'S EXHIBIT No. 46

No. 824,529. PATENTED JUNE 26, 1906.

C. DIETZ.

WASHING MACHINE.

APPLICATION FILED FEB 12, 1904

2 SHEETS—SHEET 2

Fig 6.

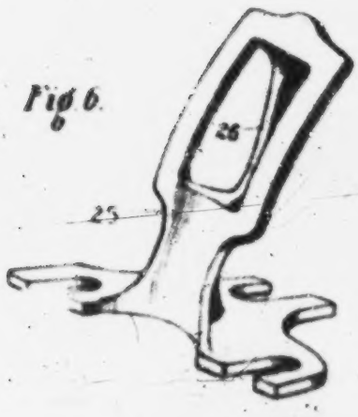


Fig 7.

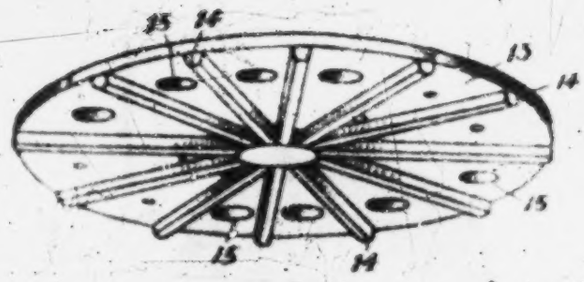
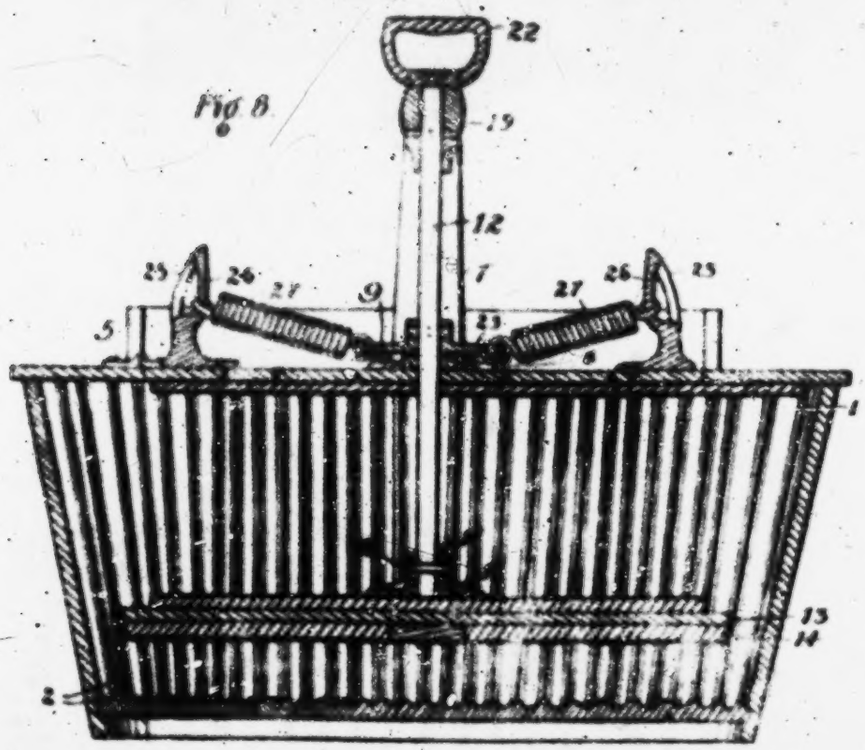


Fig 8.



WITNESSES
Flora A Power
N.O. Fry

INVENTOR
Conrad Dietz
BY James A. Rumsey
ATTORNEY

769

PLAINTIFF'S EXHIBIT No. 47

G. L. DAVIS.

AGITATOR FOR WASHING MACHINES.

APPLICATION FILED FEB. 29, 1916.

1,240,826. Patented Sept. 25, 1917.

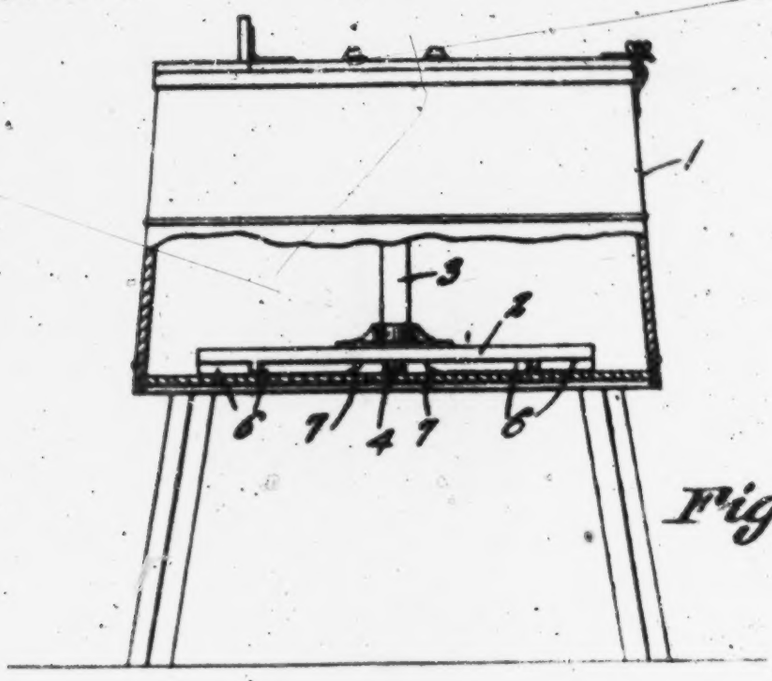


Fig. 1.

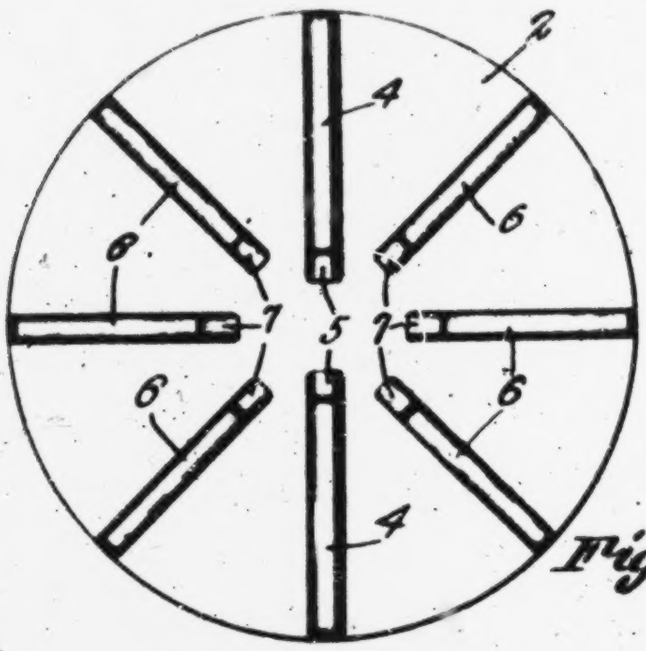


Fig. 2. Ex #47

Witnesses

[signature]

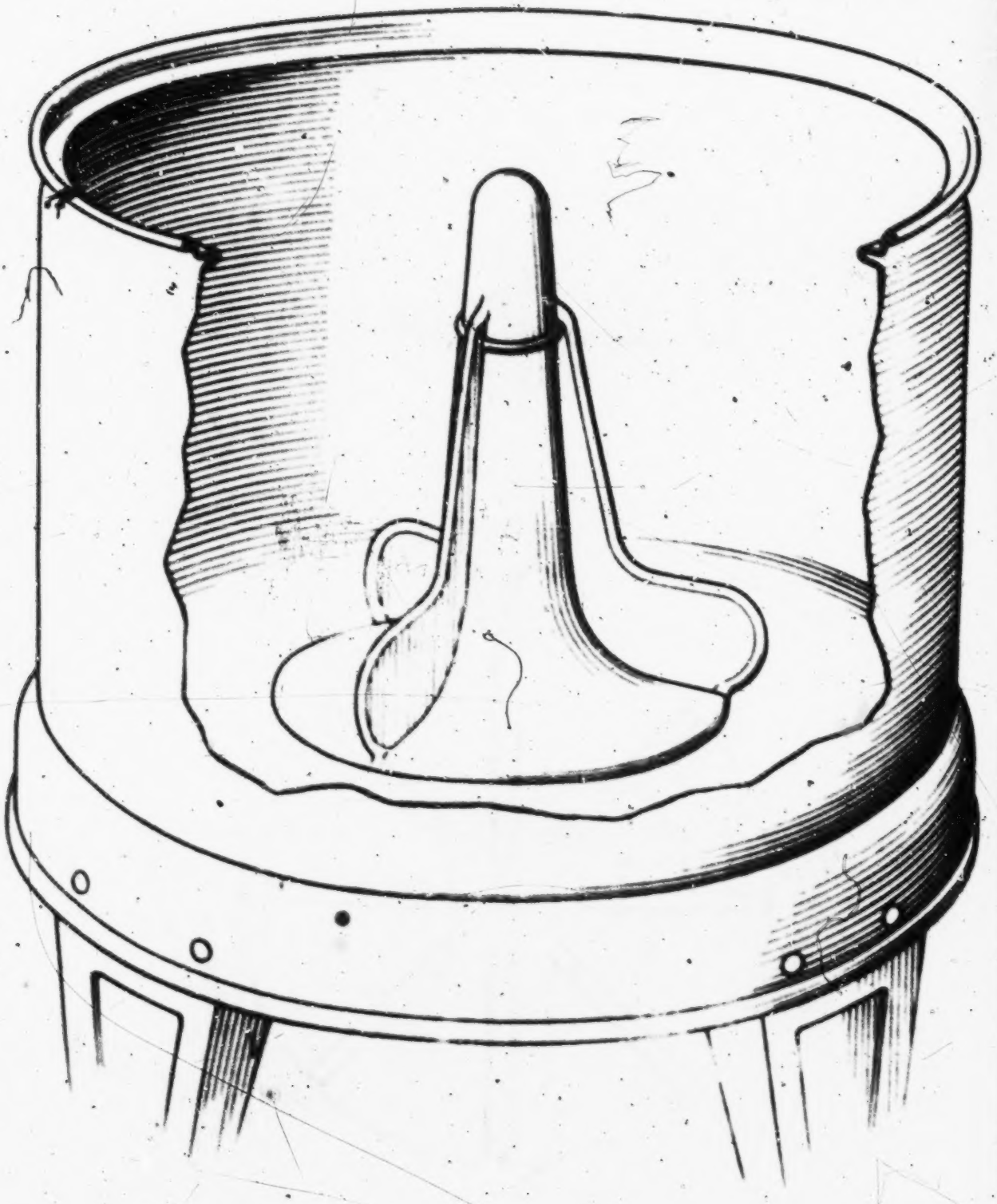
[signature]

G. L. Davis, Inventor

by C. A. Snow & Co.

Attorneys

PLAINTIFF'S EXHIBIT No. 47A

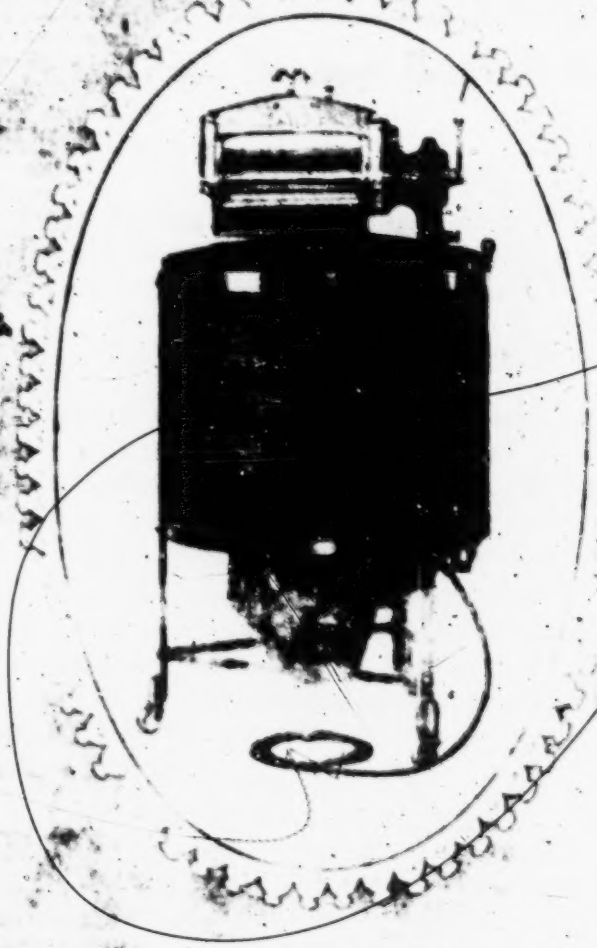


PLAINTIFF'S EXHIBIT No. 51

771

The EASY

Vacuum Electric Washing Machine



Model "M"

For Pl.
S. Dist. Court
S. D. of N. Y.
MAY 16, 1927

SYRACUSE WASHING MACHINE CORPORATION

SYRACUSE, NEW YORK

Page Tightly Bound

EVOLUTION

The Above Illustration Shows the Evolution of the "Easy" Washer, Step by Step, Thru 45 Years, From Its Beginning in 1877 to the Present Highly Developed Electrically Operated Model

THE idea of washing clothes by means of *Air-Pressure* and *Suction* was originally conceived back in 1877. The first simple "cone on a stick" device served so well to lighten the back-breaking task of washing that it met with instant approval and thousands were sold by canvassers from door to door.

Thus encouraged, rapid development followed and a year later a mechanical application of the principle was devised. It consisted of a metal contrivance which attached to an ordinary wash-tub and operated a single vacuum cup inside. This was simplified and improved in 1883.

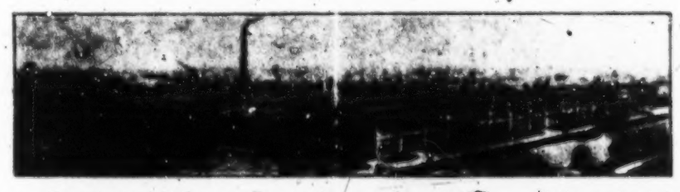
It was not until 1899 that a metal machine complete with tub and stand was designed and known as Model A. In this model the single vacuum cup was still retained but was later superseded by Model B which employed two cups that changed position with every downward stroke.

In line with the extended use of electricity in the home the first "EASY" Electric washer appeared—about 1909, and won great popularity wherever it was sold. Here again improvement followed improvement until the present "EASY" Model M was designed to embody every advantage a washing machine could possibly contain.

Throughout the forty odd years of evolution, from a "cone on a stick" to the present perfected machine, the underlying principles of *air-pressure* and *suction* have not been changed, and each succeeding year has only served to establish it as the *most* effective washing method that is known.

Because the basic idea is correct, the "EASY" is the fastest selling washing machine on the market today. A machine that can be convincingly demonstrated; that will successfully and safely wash the heaviest or finest fabrics; and that will give such satisfaction to the owner as to make her recommend it to her friends, cannot fail to prove a profitable product from a dealer's point of view.

On the strength of a successful product, a successful merchandising plan for our dealers and a reputation for fair dealing at every point, we have grown in a few years from one of the smallest to one of the largest manufacturers of washing machines in the field.



This immense factory operating under up-to-date production methods, is devoted exclusively to the manufacture of the "EASY" VACUUM ELECTRIC WASHER. Located on a twenty-five acre tract, of land with shipping facilities provided by two of the leading railroads, and the New York State Barge Canal Terminal, providing shipping facilities to Atlantic ports and to all cities and towns located on the Great Lakes. Canadian factory at Toronto, Canada. Warehouses at the following points: Boston, Mass., Hartford, Conn., Worcester, Mass., Columbus, O., Minneapolis, Minn., Chicago, Ill., Madison, Wis., Des Moines, Ia., Kansas City, Mo., Green Bay, Wis., Boise, Idaho, Salt Lake City, Utah, Portland, Ore., Butte, Mont., Los Angeles, Calif., San Francisco, Calif., Seattle, Wash., and Spokane, Wash.

THE HOME OF THE "EASY"

From the standpoint of efficient production it would be hard to imagine a better equipped manufacturing plant. Direct connection with the Lackawanna Railroad and convenient access to the New York State Barge Canal, insures adequate transportation facilities.

A beautiful, daylight factory of solid concrete and steel, fireproof construction, built on the single floor plan, affords ideal conditions for the progressive system of production, whereby the raw materials pass uninterruptedly step by step from the receiving department to finished machines.

In this manner we are insured of the low manufacturing costs which make possible such attractive list prices and liberal discounts to dealers who sell the "EASY" machine.

These are the reasons why progressive dealers invariably find the "EASY" to be the biggest money-maker they have ever handled. And that is why no direct factory dealer has ever discontinued the sale of "EASY" machines.

Why not ask us to acquaint you further with the "EASY" proposition? You may be sure it will imply no obligation.

Syracuse Washing Machine Corporation, Syracuse, N. Y.

Mechanical Description of the "EASY"

The principle of washing clothes by *air pressure* and *suction* originated in 1877—forty-five years ago. The American housewife quickly accepted and approved this principle, with the result that since then this method of washing clothes has been developed step by step, as here illustrated. Its popularity has consistently increased, until today it is recognized as the most efficient mechanical method for washing clothes. The latest development is the Model M "EASY" VACUUM ELECTRIC WASHER—a washing machine that makes wash day a pleasure instead of a day to be dreaded. No printed description can convince you of the merits of the "EASY". Only a trial will prove its unusual efficiency.

PRINCIPLE. The "EASY" washes clothes by means of *air pressure* and *suction*. The revolving cups inside of the tank move up and down 50 to 60 times per minute, changing position on the downward stroke. On the down stroke the air contained in the cups forces the soapy water thru the mesh of the garments. On the up stroke the cups draw the water again thru the mesh. This action carries with it any foreign substance or dirt lodged in the mesh. It does not in the least injure the daintiest laces, flannels, or lingerie. It will wash the finest fabrics or the heaviest blankets. It eliminates friction, which shortens the life of the clothes. It washes rapidly and thoroughly, with little attention on the part of the operator.

CAPACITY. Eight double or ten single sheets, or the equivalent in other clothes. The tank is 24" in diameter, 18½" high, having a larger capacity than most washers.

TANK. Made from heavy gauge solid copper, cold rolled and planished, which process hardens the copper and applies a smooth surface. ¾" roll rim edge around the top to insure rigidity. Highly polished and lacquered outside and tinned on the inside to prevent discoloring and corrosion. It is absolutely sanitary, having no corrugations or corners to retain impurities or soapy water. Fitted with a one-piece solid copper removable cover. The discharge valve on the bottom of tank is solid brass, nickel plated, and empties the tank within a few minutes, and can be connected by means of hose or pipe to the water and sewer system. The vacuum cups are easily removed, allowing free access when loading or unloading the washer. These cups are adjustable to three positions for small, medium, and full size loads, to accommodate the varying requirements of the family wash. Made from solid copper, nickel plated and polished.

Model "M" with Direct Gear Drive

MOTOR. Equipped with ¼ H. P. General Electric motor (or other standard motor) attached to the chassis under the tank requiring no adjustment. The "EASY" can also be supplied with pulley attachment instead of motor, to operate the washer from gas engine or line shaft.

FRAME. The tank sets on a cast iron chassis which is supported by three channel iron legs. The operating mechanism is under the tank, attached to the chassis. All gears and moving parts are enclosed, giving free access to all sides of the machine. The three legs are arranged in tripod form, allowing the machine to stand rigid and steady on an uneven floor. The legs are equipped with swivel casters making it easy to move the machine about.

WRINGER. The wringer frame is made of highly polished aluminum. 12" rubber rolls. Swings easily, and locks automatically in either of four positions. It is started, stopped, and reversed instantly by a conveniently placed lever. The gears are enclosed. Equipped with one-piece metal reversible waterboard which can be firmly locked in position. Equipped with positive instant release safety device, which allows a wide spread between the rolls when released. The aluminum wringer is a decided improvement over the wooden wringer because it does not absorb the soapy water and is easily kept clean and bright, and will not warp.

TRANSMISSION. The driving mechanism consists of machine cut helical gears mounted on heat-treated, hardened, and ground shaft, enclosed in a gear case which contains grease and will not require refilling or oiling for a period of three years.

AUTOMATIC CUTOUT. Attached to frame is a switch which is called an "automatic cutout" because it automatically cuts off the electric current and stops the motor in the event that the washer or wringer is overloaded. This is protection against burning out of the motor, and saves possible damage to the washer and clothes.

OPERATION. The "EASY" is easy to understand and to operate. There are only two levers, one starts and stops the vacuum cups—the other starts, stops and reverses the wringer. Both levers are conveniently located near the top of the tank, which eliminates stooping of the operator.

Within one hour the "EASY" will wash as much as a good laundress would wash in four or five hours by the old rub-board method. A full load can be washed in from ten to twenty minutes, depending upon the soiled condition of the clothes. The current consumed will cost from one to two cents per hour.

The yoke pin which holds the yoke to the piston in the center of the tank, is designed so that it always remains in the basin yoke. It cannot fall out or become lost.

SPECIAL FEATURES. The "EASY" occupies little more space than an ordinary wash tub. It is easily moved about. All operating parts are out of the way, enclosed under the tank. Protected against overload by the automatic cutout switch. Comparatively few places which require oiling.

GUARANTEE. We guarantee the "EASY" VACUUM ELECTRIC WASHER for one year from date of sale against defects in material or workmanship.

Patented in the United States and all civilized foreign countries.

Syracuse Washing Machine Corporation

Syracuse, N. Y.

PLAINTIFF'S EXHIBIT No. 51A

771

SYRACUSE WASHING MACHINE CORPORATION

MANUFACTURERS OF

The EASY Vacuum Electric WASHER

E. NEW YORK

pt. 3, 1925.

We have your letter of August 29 and are pleased to note that our new one shot oiling system meets with your hearty approval.

The points raised by your letter are covered by our new instruction folder under item #5. A copy of this latest instruction folder is enclosed herewith and will be included with our machines shipped in the future.

The motor requires very little lubrication, 4 to 6 drops of medium motor oil being required not oftener than 2 or 3 times a year. Using an oil can with a slight bent in the spout will make it very easy to oil the back bearing. However, there is no objection to removing the nickel cap if you desire.

Yours very truly,

SYRACUSE WASHING MACHINE CORPORATION

SERVICE MANAGER.

EPB:AM

INSTRUCTIONS

For the Operation and Care of

The EASY Vacuum Electric WASHER

THE EASY is usually installed and set up ready for use by the dealer. It is well, however, for the new user to carefully read our instructions so as to become thoroughly familiar with the most efficient method of operation.

The vacuum cup assembly should be attached to one of the three holes in the piston, by means of the pin in basin yoke. Be sure there is nothing left inside of the tank except this yoke assembly.

Remove cork from vent in gear case, under tank. This cork is placed in vent at the factory to prevent spilling of oil while machine is being shipped. BE SURE THIS CORK IS REMOVED BEFORE THE MACHINE IS OPERATED.

TO ATTACH CASTERS The casters for the three legs will be found (with other small miscellaneous parts), in the pasteboard carton fastened to the bottom of the crate. Before inserting the caster stems into the sockets in caster mounts on legs of the machine, place a small quantity of oil on the stems so the casters will operate easily. Loosen the upper set screw (K) on the inside of the legs, insert the casters into sockets and tighten the screws, so as to hold casters and prevent them from falling out.

TO ATTACH WRINGER The wringer is attached by slipping the sleeve of wringer reverse case (A) over the vertical standard tube (B), pulling out lock pin (C) and holding it out while swinging the wringer back and forth until it seats itself in its proper position. To change position of the wringer, pull out lock pin (C) and swing the wringer to desired position. The lock pin (C) will snap into place automatically and hold the wringer firmly in any one of four points.

Attach the waterboard to the wringer by placing it between the wringer frame so that the notched flanges on the bottom of the board rest on the round tie rod at the bottom of the wringer frame. These notches fit over the rod and hold the board. The waterboard is locked in position by the swinging clothes guard.

PACKING NUT Next remove packing nut (E) on top of center post through which piston travels up and down inside of tank. Wipe off packing in nut but do not remove packing as it has been securely set at the factory. Also wipe off piston. Then place a liberal amount of soap on the packing and in the recess of the center post on which the packing sits when in place. The soap lubricates this joint and will greatly lengthen the life of the packing. Now replace nut on center post, tightening it by hand only.

CLEANING TUB Copper tubs are lined with a plating to appear bright and clean. It is advisable on new copper tubs to place a film of soap over the tub bottom and sides up to the water line before putting any water in them. This is easily done by a soapy cloth. A liberal amount of soap should be used. Leave this film on and apply just before the water and clothes are put in. This need only be done the first time machine is used.

PLACING THE MACHINE With the wringer in position over the tank, place the machine (with nameplate on tub board to front) against laundry trays or tubs used for rinsing, with the vertical wringer standard tube on which wringer swings, parallel with partition in laundry trays, or division between rinsing tubs. This will permit wringing from washer and tubs by swinging the wringer and without moving the machine or tubs. The above illustration shows how the swinging operations may be done without changing position of the machine.

HOW TO OPERATE THE "EASY" WASHER

A two-part separable plug is supplied for connecting machine to electric current. Screw the threaded end of the plug into the socket as far as it will go, and then insert in it the other half of the plug which is attached to the end of the cord.

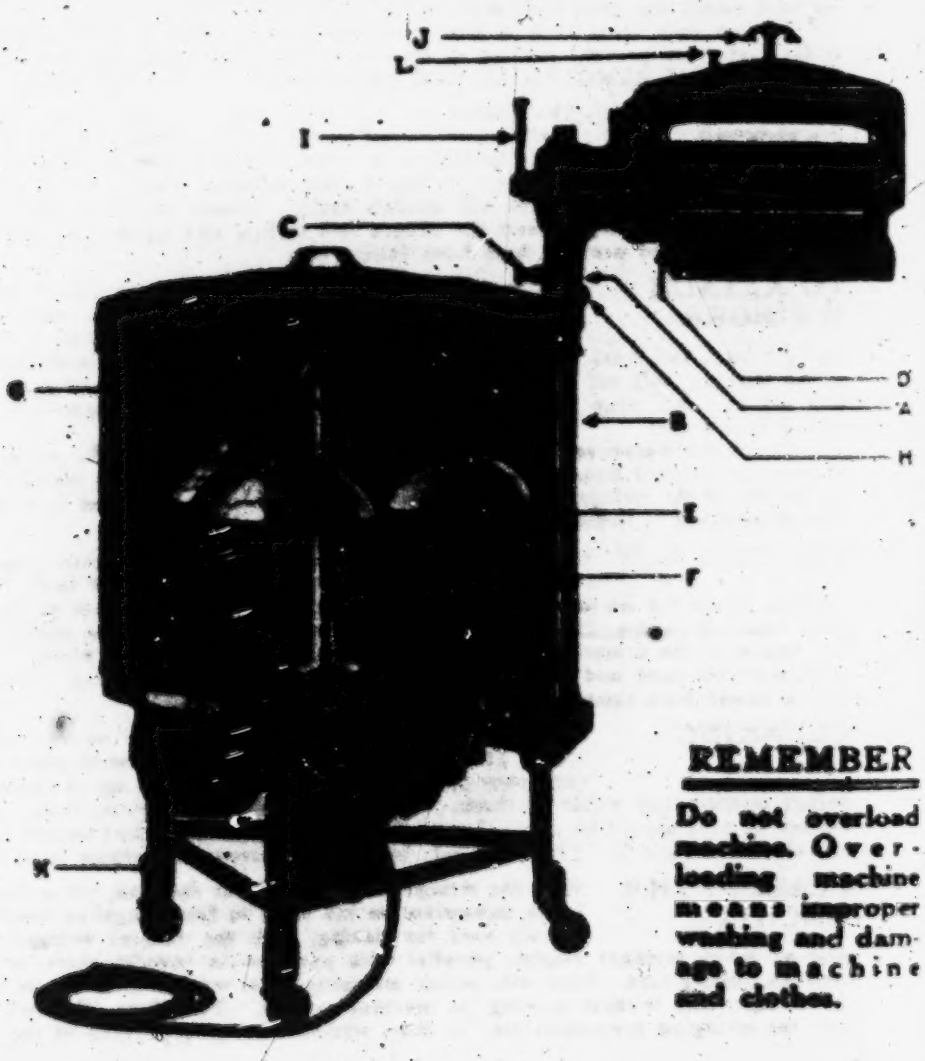
To start the motor, push the RED button on the left side of the overload switch (G) and hold it there for about two seconds until the motor gathers speed. IT IS IMPORTANT TO HOLD THE STARTING BUTTON IN POSITION FOR ABOUT TWO SECONDS, OTHERWISE THE MOTOR WILL NOT RUN. To stop the motor, push the black button downward.

This is a two-function switch. It is used to start or stop the motor, and also acts as an overload switch. When the machine or wringer is overloaded the switch automatically stops the motor. It is very important not to overload the machine or wringer. Should the overload switch stop the motor while machine is washing and ordinary wringing is in process, the MACHINE IS OVERLOADED and it will be necessary for the operator to remove some of the clothes before again starting the machine. The overload switch will stop motor when wringing, if clothes are passed through the wringer in "bunches." Clothes should be spread out evenly. Do not try to see how many pieces you can get through the wringer at one time. The EASY will wash and wring at the same time if properly loaded. If this overload switch were not provided, the overload might cause injury to the motor, considerable inconvenience to the operator and damage to the clothes.

After the motor is running smoothly, then start the vacuum cups by means of clutch lever (H), which is conveniently located at the top of the tank. A push to the right starts the cups—a push to the left stops them. OPERATE THIS CLUTCH LEVER ONLY WHEN THE MOTOR IS IN MOTION.

Use hot water in which has been dissolved one-half to three-quarters of a standard size box of good soap chips. If bar soap is used, it should be cut and dissolved before putting in the wash water. If it is the custom of the user of the machine to soak clothes over night in cold water, very hot soapy water can be used in the tank of the machine. If clothes are not soaked over night, water no hotter than your hands can bear should be used for best results.

For a full load put fifteen (15) gallons of water into the tank, which is approximately the proper quantity, so when the clothes are placed in the water, the contents will not be above the water line (F). UNDER NO CIRCUMSTANCES SHOULD THE WATER, AFTER THE CLOTHES ARE IN IT, BE ABOVE THE WATER LINE (F).



REMEMBER

Do not overload machine. Overloading machine means improper washing and damage to machine and clothes.

Your Machine is not guaranteed until the GUARANTEE

LOADING A full load is approximately eight double sheets, or ten single sheets, or the equivalent in other clothes. When the tank is loaded to its maximum capacity up to the water line (F), then the basin yoke should be attached through the TOP HOLE of the piston.

For a maximum load the basin should be attached through the top hole in the piston and the contents of the tank (including water and clothes) should not be above the water line (F).

For a medium load the basin yoke should be attached through the center hole in the piston, and water and clothes should be lowered about one inch below water line.

For a minimum load the basin yoke should be attached through the lower hole in the piston, and water and clothes should be lowered about one inch more, or two inches below water line.

In all three instances it is of the utmost importance that the water and clothes be low enough in the tank so that the vacuum cups, on their up stroke, are two inches above the water, allowing the air to enter the cups before making their down stroke, and allowing the cups to change position. WE CANNOT OVER-EMPHASIZE THE IMPORTANCE OF THIS FEATURE. If you will carefully observe these instructions, you will get the best results. OVERLOADING THE MACHINE MEANS SLOW AND IMPROPER WASHING AND DAMAGE TO THE MACHINE AND CLOTHES. Put in only as many clothes as will make a loose, spongy, flexible mass, so that clothes will readily change position and yield easily to the vacuum cups. Do not pack clothes in solid.

Throughout the washing process, maintain a liberal creamy suds in the tank, which may necessitate adding soap from time to time. The average tubful of clothes should be washed for about ten minutes and then wrung into the rinse water. For best results, it is preferable to use warm water for rinsing as plunging clothes from hot water into cold water closes the mesh of the cloth and prevents perfect rinsing. Before wringing out of tank remove basin yoke to which vacuum cups are attached. (This is easily removed by pulling out basin yoke pin and lifting yoke up off the piston.) The first load can be wrung from the rinse water while the second load is being washed. When washing very greasy or oily clothing, we suggest that there be added to the water one-third of a cup of good soap powder and the clothes washed for a period of from fifteen to twenty minutes.

How to Operate Wringer on the "Easy" Washer

Wringer is operated by means of lever (I), which is in neutral position when pointing upward. For wringing from the tank, this lever is pushed forward or away from you. When lever is pulled back, or toward you, it reverses the turning of the rolls.

Watch small pieces as they pass through the wringer. It is a good practice to feed them through the wringer on top of large pieces. In case clothes wind around wringer rolls, reverse wringer instantly, take hold of cloth and slightly pull back as cloth unwinds. If impossible to quickly unwind this way, place lever in neutral position, and relieve pressure on rolls by turning back pressure screw (J) on top of wringer. This will enable the operator to raise the upper roll to get at the clothes. The lower roll can also be lifted up, giving free access to all sides.

Release lever (L) is to instantly remove the pressure between the rolls and is to be used only in an emergency. Should clothes wind around the rolls, it is better to first place the control lever (I) in neutral position, and relieve pressure by backing off screw (J).

Turn down wringer pressure screw (J) only enough to wring the surplus water from the clothes. Do not put too much tension on the wringer rolls, as this places a heavy load on the motor, consumes more current and is a strain on the wringer rolls, as well as the clothes. Spread the clothes so they will feed evenly through the wringer.

After each washing release the tension from the wringer rolls by means of the pressure screw. In case rolls require cleaning, use warm water and soap. If rolls become greatly soiled, use a cloth moistened with gasoline—NEVER USE KEROSENE.

How to Care for the "Easy" Washer

One of the most important details in the care of the "EASY" VACUUM ELECTRIC WASHER is to see that it is kept clean. Do not allow dirt to accumulate on the bearings or other working parts. Keep the packing nut properly tightened to prevent water running down piston.

After each washing remove vacuum cups, rinse them in clean hot water and wipe with a dry cloth; also wipe off the exposed part of piston inside of tank. (An easy way to do this is to have cups removed and have machine operating and hold cloth against piston while in motion.) Inside of tank should be rinsed and wiped dry after each washing. Never allow the wash water to stand in the tank after the washing is completed. This will prevent discoloration of the inside of tank. Outside of copper tank should be gone over with cloth slightly dampened with paraffin oil. We suggest using paraffin oil before the machine is first used. This attention will keep the machine looking bright and new.

A pin, button or lint lodged in the discharge valve, which would prevent its closing tight, may cause the valve to drip. Open valve wide, insert finger and remove obstruction.

REMEMBER! DO NOT OVERLOAD THE MACHINE. We cannot emphasize this point too strongly. The normal water line is indicated by the bead or ridge around the tank, about 7¼ inches from the bottom of the tank. For the maximum load, water and clothes should NEVER come above this water line.

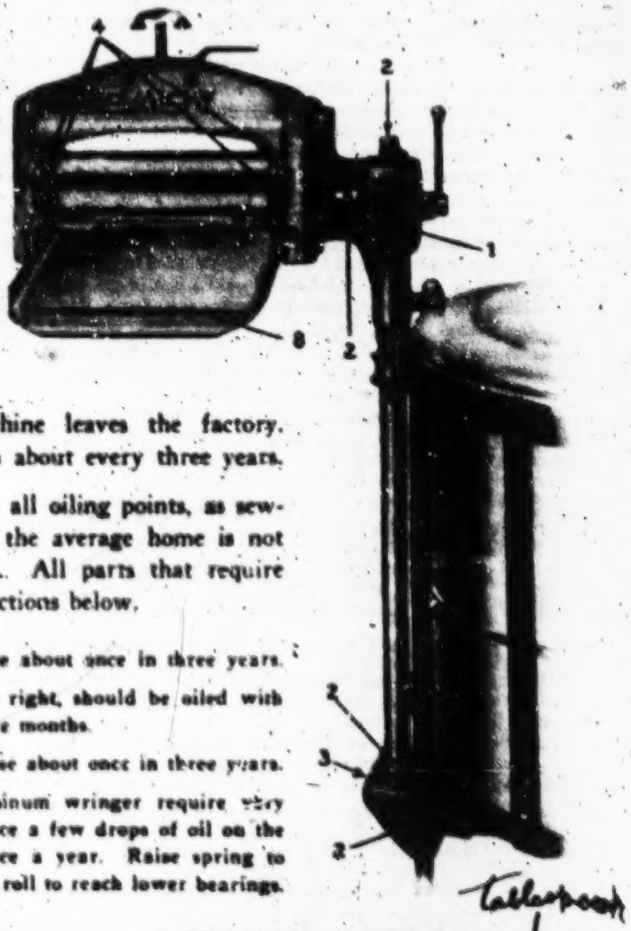
Also remember to adjust vacuum cups for the various size loads. For each hole that cups are lowered, have the water and clothes proportionately lower. On the up stroke the vacuum cups should rise two inches above the contents of the tank to get air and change position. When full capacity of machine is used, cups should be attached in topmost hole in the piston.

The "EASY" will wash and wring at the same time when properly loaded, and the second batch of clothes can be washed while the first batch is being rinsed and blued. Note various positions of wringer illustrated on first page of this folder.

RD CARD is properly filled out and returned to manufacturer

KEEP MACHINE PROPERLY OILED

HOW TO OIL THE "EASY" WASHER



THE "EASY" VACUUM ELECTRIC WASHER, the same as any other machine, will require a little care and attention. This, however, has been reduced to the very minimum, consistent with satisfactory operation. Gears that are subject to speed or wear run in gear cases filled with grease or oil, which are properly filled before the machine leaves the factory. These points will only need attention about every three years.

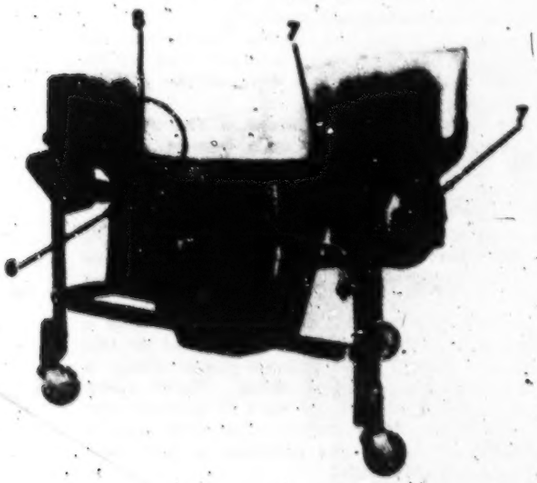
Medium motor oil should be used at all oiling points, as sewing machine oil usually available in the average home is not heavy enough for proper lubrication. All parts that require oil should be oiled according to instructions below.

1 Remove cover and fill with cup grease about once in three years.

2 All points numbered 2 on diagram at right, should be oiled with six drops of motor oil about every three months.

3 Remove cover and pack with cup grease about once in three years.

4 Ball bearings on the one piece aluminum wringer require very little lubrication. With an oil can place a few drops of oil on the back side of the bearing once or twice a year. Raise spring to reach upper roll bearings. Raise upper roll to reach lower bearings.



5 Fill this distributing reservoir, WHILE CUPS ARE IN MOTION, once every three months with about one teaspoon of medium motor oil. The oil is automatically distributed to all bearings beneath the machine.

6 After three years of average use, remove the oil plug inside of gear case marked "Oil level." Using an oil can or larger oil can place oil in case to the hole just above main shaft. After oil flows from oil level hole, replace plug. The gear case is now ready for another three years.

7 Place four to six drops of medium motor oil in oil holes in motor bearings, every four to six months under normal use.

8 Place drain board so that slotted end is over tub from which clothes are being wrung.

Syracuse Washing Machine Corporation
Syracuse, N. Y.

Mail the Guarantee Record Card Now

779

POST CARD

Place 2c Stamp Here

Syracuse Washing Machine Corporation

Syracuse

New York

GUARANTEE RECORD

To be mailed to Syracuse Washing Machine Corporation, Syracuse, N. Y.

Name of Purchaser.....

Address .....

Name of Dealer or Agent.....

Address .....

Machine Number.....Motor Number.....

Date Machine Delivered.....

Provided it is purchased from an authorized dealer, the SYRACUSE WASHING MACHINE CORPORATION accepts guarantee liability on the above described "EASY" VACUUM ELECTRIC WASHER for one year from date of delivery in accordance only with printed guarantee which will be sent upon receipt of this card properly filled out and mailed to

SYRACUSE WASHING MACHINE CORPORATION
Syracuse, New York

PLAINTIFF'S EXHIBIT No. 51-B

780

INSTRUCTIONS

for the Operation and Care of

The EASY Vacuum Electric WASHER

To Install the "Easy" Vacuum Electric Washer

WE suggest that before attempting to operate the "EASY" VACUUM ELECTRIC WASHER for the first time, you carefully read the following instructions so that you may understand the operation of the machine thoroughly.

Remove all parts that are wrapped and tied to the center post on the inside of the tank. Be sure there is nothing left in the tank except the vacuum cups.

Attach the vacuum cups to one of the three holes in the piston by means of the pin in the basin yoke.

The casters for the three legs will be found in a cloth bag which accompanies the machine. Before inserting the caster stems into the sockets be sure to oil the stems so the casters will operate easily. Insert the casters into sockets and tighten the upper screws on the inside of the legs, which will prevent casters from falling out.

Next attach the wringer by means of slipping the sleeve of wringer reverse case (A) over the vertical standard tube (B), pull out lock pin (C), and hold it out while you swing the wringer back and forth until it seats itself in its proper position. To change position of the wringer, pull the spring lock pin (C) and swing the wringer to desired position. The lock pin (C) will snap into place automatically and hold the wringer in any one of four positions. The illustrations above show how the various wringing operations may be done without moving the machine.

Attach the waterboard to the wringer by simply placing it between the wringer frame so that the notched flanges on the bottom of the board rest on the round tie rod at the bottom of the wringer frame. These notches fit over the rod and hold the board. The waterboard is locked in position on either side of the wringer by means of catches marked (D). In placing board in wringer see that notches on top of board come on the same side as the catches (D) on the wringer frame.

Next tighten the packing nut (F) on the top of the center post inside of the tank. Tighten this by hand only. Do not use a wrench or other tool. This packing nut may again require tightening after the first washing has been done. It contains braided flax packing which prevents the water from following the piston rod down thru the center post. If the packing nut is screwed down too tight, (such as might happen if tightened by a wrench), then it will cause an overload on the motor and waste power. If the machine leaks thru the center post, tighten the packing nut.

Remove cork from vent, in side of gear case, under tank. This cork is placed in vent at factory to prevent spilling of oil while machine is being shipped, and should be removed before machine is operated.

GUARANTEE WILL NOT APPLY UNLESS YOU SIGN AND MAIL THE CARD BELOW FOR OUR OFFICIAL GUARANTEE

How to Operate the "Easy" Washer

Put about fifteen (15) gallons of water into the tank, which is approximately the proper quantity, so when the clothes are placed in the water the contents will not be above the water line (F). UNDER NO CIRCUMSTANCES SHOULD THE WATER, AFTER THE CLOTHES ARE IN IT, BE ABOVE THE WATER LINE (F).

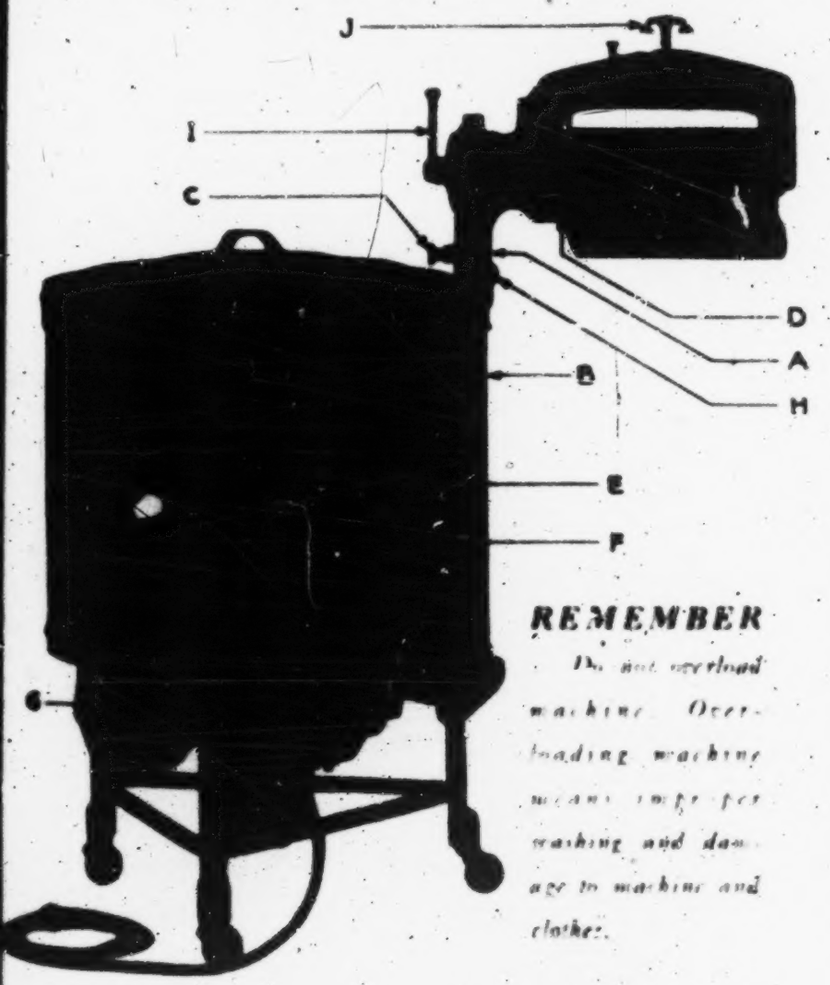
A full load is approximately eight double sheets or ten single sheets or the equivalent in other clothes. When the tank is loaded to its maximum capacity up to the water line (F), then the basin yoke should be attached thru the top hole of the piston, and the springs contained inside of the vacuum cup stems, should not show a compression of more than ⅛" to ¼" when the machine is in operation.

For a maximum load the basin yoke should be attached thru the top hole in the piston and the contents of the tank should not be above the water line (F).

For a medium load the basin yoke should be attached thru the center hole in the piston, and water should be lowered about one inch by drawing off through discharge valve.

For a minimum load the basin yoke should be attached thru the lower hole in the piston, and water should be lowered about one inch more or two inches below water line.

In all three instances it is of the utmost importance that the water be low enough in the tank so that the vacuum cups, on their up stroke, are two inches above the water, allowing the air to enter the cups before making their down stroke, and allowing the cups to change position. WE CANNOT OVER EMPHASIZE THE IMPORTANCE OF THIS FEATURE. If you will carefully observe these instructions, you will get the best results. OVERLOADING THE MACHINE MEANS SLOW AND IMPROPER WASHING AND DAMAGE TO THE MACHINE AND CLOTHES.



REMEMBER

Do not overload machine. Overloading machine means injury to washing and damage to machine and clothes.

Use hot water in which has been dissolved one standard size box of good soap chips, or a bar of good grade laundry soap. If bar soap is used, it should be cut and dissolved before putting it in the wash water.

A two-part separable plug is supplied for connecting machine to electric current. Screw the threaded end of the plug into the socket as far as it will go, and then insert in it the other half of the plug which is attached to the end of the cord.

To start the motor, push the red button on the left side of the overload switch (G) and hold it there for about two seconds until the motor gathers speed. IT IS IMPORTANT TO HOLD THE STARTING BUTTON IN POSITION FOR ABOUT TWO SECONDS, OTHERWISE THE MOTOR WILL NOT RUN. To stop the motor, push the black button downward.

This is a two-function switch. It is used to start or stop the motor and also acts as an overload switch. When the machine or wringer is overloaded the switch automatically stops the motor. It is very important not to overload the machine or wringer. Should the overload switch stop the motor while machine is washing and ordinary wringing is in process, the MACHINE IS OVERLOADED and it will be necessary for the operator to remove some of the clothes before again starting the machine. The overload switch will stop motor when wringing if clothes are passed thru the wringer in "bunches." Clothes should be spread out evenly. Do not try to see how many pieces you can get thru the wringer at one time. The "EASY" will wash and wring at the same time if properly loaded. If this overload switch was not provided, the overload might cause injury to the machine, considerable inconvenience to the operator and damage to the clothes.

After the motor is running smoothly, then start the vacuum cups by means of clutch lever (H), which is conveniently located at the top of the tank. A push to the right starts the cups—a push to the left stops them. OPERATE THIS CLUTCH LEVER ONLY WHEN THE MOTOR IS IN MOTION.

The average tubful of clothes should be washed for about fifteen minutes and then wrung into the rinse water. For best results, it is preferable to use warm water for rinsing. Before wringing, remove basin yoke to which vacuum cups are attached. (This is easily removed by pulling out basin yoke pin and lifting basin yoke up off the piston). Push piston down to its lowest point of travel, which gives free access to inside of tank. The first load can be wrung from the rinse water while the second load is being washed. Throughout the washing process, maintain a liberal, creamy suds in the tank, which may necessitate adding soap from time to time. When washing very greasy or oily clothing, we suggest that there be added to the water one-third of a cup of good soap powder and the clothes washed for a period of from fifteen to twenty minutes.

How to Operate Wringer on the "Easy" Washer

Wringer is operated by means of lever (I), which is in neutral position when pointing upward. For wringing from the tank, this lever is pushed forward or away from you. When lever is pulled back, or toward you, it reverses the turning of the rolls.

Watch small pieces as they pass thru the wringer. It is good practice to feed them through the wringer on top of the larger pieces. In case clothes wind around wringer rolls, reverse wringer instantly, take hold of cloth and slightly pull back as cloth unwinds. If impossible to quickly unwind this way, place lever in neutral position, release safety release at top of wringer. This will enable the operator to raise the upper roll to get at the clothes. The lower roll can also be lifted up, giving free access to all sides.

Turn down wringer pressure screw (J) only enough to wring the surplus water from the clothes. Do not put too much tension on the wringer rolls, as this places a heavy load on the motor, consumes more current and is a strain on the wringer rolls, as well as the clothes. Spread the clothes so they will feed evenly thru the wringer.

After each washing release the tension from the wringer rolls by means of the pressure screw. In case rolls require cleaning, use warm water and soap. If rolls become greatly soiled, use a cloth moistened with gasoline—NEVER USE KEROSENE.

How to Care for the "Easy" Washer

One of the most important details in the care of the "EASY" VACUUM ELECTRIC WASHER is to see that it is kept clean. Do not allow dirt to accumulate on the bearings or other working parts. This applies to the ratchet mechanism on lower end of piston, under tank. If the vacuum cups do not revolve freely, clean ratchet at bottom of piston with kerosene oil. Easy access to ratchet can be had thru door in side of casing beneath the tank. Keep the packing nut properly tightened to prevent water running down piston and getting on the ratchet, causing the ratchet to become "gummed up." Follow this suggestion and you will not have to clean the ratchet.

After each washing remove vacuum cups, rinse them in clean hot water and wipe with a dry cloth; also wipe off the exposed part of piston inside of tank. (An easy way to do this is to have cups removed and have machine operating and hold cloth against piston while in motion.) Inside of tank should be rinsed and wiped dry after each washing. Never allow the wash water to stand in the tank after the washing is completed. This will prevent discoloration of the inside of tank. Outside of copper tank should be gone over with cloth slightly dampened with paraffin oil. We suggest using the paraffin oil before the machine is first used. This attention will keep the machine looking bright and new.

Be sure to keep the machine oiled according to instructions on back page of this folder. Parts requiring oil have been reduced to the minimum in the "EASY" VACUUM ELECTRIC WASHER.

REMEMBER! DO NOT OVERLOAD THE MACHINE. We cannot emphasize this point too strongly. The normal water line is indicated by the bead or ridge around the tank, about 7¼" from the bottom of the tank. For the maximum load, water and clothes should NEVER come above this water line.

Also remember to adjust vacuum cups for the various size loads. For each hole that cups are lowered, have the water and clothes proportionately lower. On the up stroke the vacuum cups should rise two inches above the contents of the tank to get air and make the turning movement. When full capacity of machine is being used, cups should be attached in the top-most hole in the piston.

Manufactured by

Syracuse Washing Machine Corporation

SYRACUSE, N. Y.

FILL IN AND MAIL THIS CARD

GUARANTEE RECORD

To be mailed to Syracuse Washing Machine Corporation, Syracuse, N. Y.

Name of Purchaser .....

Address .....

Name of Dealer or Agent .....

Address .....

Machine Number ..... Motor Number .....

Date Machine Delivered .....

The SYRACUSE WASHING MACHINE CORPORATION accepts guarantee liability on the above described "EASY" VACUUM ELECTRIC WASHER for one year from date of delivery in accordance only with printed guarantee which will be sent upon receipt of this card properly filled out and mailed to

SYRACUSE WASHING MACHINE CORPORATION

Syracuse, N. Y.

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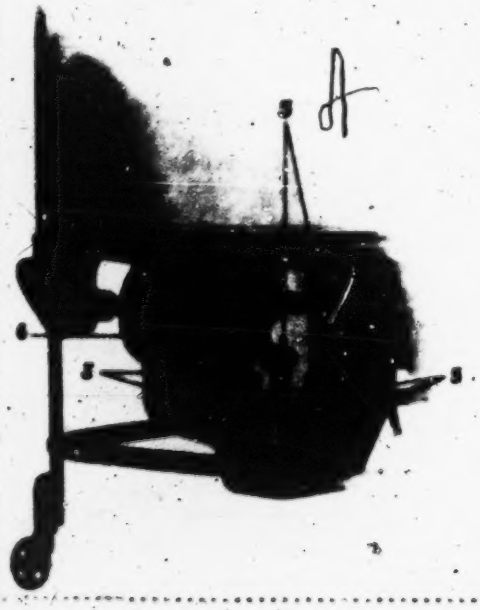
KEEP MACHINE PROPERLY OILED

How to Oil the "Easy" Washer

THE "EASY" VACUUM ELECTRIC WASHER, the same as any other machine, will require a little care and attention. This, however, has been reduced to the very minimum, consistent with satisfactory operation. Gears that are subject to speed or wear, run in gear cases filled with grease or oil, which are properly filled before the machine leaves the factory. These points will only need attention about every three years. Place four to six drops of medium motor oil in oil holes in motor bearings, every four to six weeks under normal use. Medium motor oil should be used at all oiling points, as sewing machine oil usually available in the average home is not heavy enough for proper lubrication. All parts that require oil should be oiled according to instructions below.

1 Remove cover and fill with cup grease about once in three years.

2 All points numbered 2 on diagram at right, should be oiled with six drops of motor oil about every three months.



3 Remove cover and pack with cup grease about once in three years.

4 Ball bearings in wringer should be lubricated with plain vaseline once a year. Take a little vaseline on the point of a table knife, raise upper roll and press vaseline into opening at top of ball bearings. Do the same for upper bearing by raising spring.

5 All points numbered 5 on diagram at left should be oiled with five or six drops of motor oil about every three months.

6 The oil in crank case should be changed every three years. Drain old oil through pipe plug in bottom of case and refill with two scant cups (¾ pint) of heavy motor oil through hole in side of crank case near main shaft.

POST CARD

PLACE ONE CENT STAMP HERE

Return this Card and Get Your Guarantee

Syracuse Washing Machine Corporation

Syracuse

N. Y.

Form F 247

PLAINTIFF'S EXHIBIT No. 52

783

DIRECTIONS FOR OPERATING MODEL "3F"

EASY WASHER

1. Place machine in desired position before laundry tubs.

2. Fill tub with hot water to ½" below load line on agitator.

3. Put in about 2 cups of soap flakes or, if bar soap is used, about one-half bar dissolved in hot water. Run agitator a few minutes to thoroughly dissolve soap and make a good suds. Always use plenty of soap.

4. *With agitator running* put in clothes, one piece at a time. (It is recommended that all strings be tied in a bow knot). Overloading lessens the roll-

(over)

GUARANTEE RECORD Machine Number 3F.....

To be mailed to Easy Washing Machine Corporation, Syracuse, N. Y.
Be sure to fill in all blanks above and below.

Name of Purchaser.....
Print Name Carefully

Address .....

Name of Dealer..... Address.....

Name of Salesman.....

Date of Sale..... (Check which) ☐ Electric Motor ☐ Gasoline Motor

Provided it is purchased from an authorized dealer, the EASY WASHING MACHINE CORPORATION accepts guarantee liability on the above described "EASY" WASHER for one year from date of delivery in accordance only with printed guarantee which will be sent upon receipt of this card properly filled out and mailed to

EASY WASHING MACHINE CORPORATION
Syracuse, New York

6614-D883

over fast washing quality of the machine, and is a time saver.

5. Run agitator 8 to 12 minutes, depending on amount of soil in the clothes. The "EASY" agitator is very gentle on the clothes and will not harm them.

6. Keep cover on tub while washing to preserve heat.

7. After washing, rinse tub and wringer rolls and wipe dry. IMPORTANT — always release pressure on wringer so rolls will remain soft and true. With ordinary care this washer will give perfect service for many years.

Oiling

Use medium automobile oil, every three months:

Place six to ten drops in upper oil hole at left of wringer starting lever. Also a few drops in the two lower oil holes at left and right. Oil both motor bearings through holes in side of motor frame.

Place 10 drops in hole at lower end of wringer standard tube.

Regular oiling means long life.

POST CARD

PLACE STAMP HERE

Easy Washing Machine Corporation

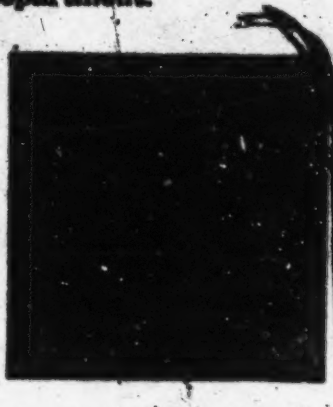
Syracuse, New York

What's New?

The editor of the Easy Merchandiser has been busy on other things lately and a lot of things have happened since our last issue. So many, in fact, that we are putting them all in this special "What's New?" department.

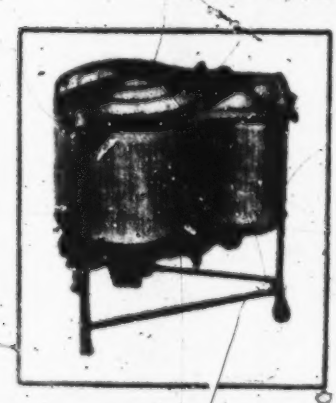
EASY WASHERS

High Center Post Agitator



The new, specially designed Easy agitator that has taken the place of the low agitator on the original Models D and F is exceptionally efficient. It is the biggest agitator on the market and does the most effective washing job. Specially designed fins that mount the center post to the water line overcome the tendency to tangle the clothes found in all other agitator washers. They keep the clothes in constant suspension and assist in providing an ideal "roll-over" movement that washes thoroughly.

Model D Now Has Domed Top and Narrow Tub Rim



Standardization in production has resulted in a considerably improved appearance of the Model D Easy Washer through providing this model with the same narrow tub rim and domed top that has always been used on the Model U. Easy dealers and salesmen will welcome this change as the uniformity of parts will simplify service and the simpler design will speed up the home demonstration of the D.

New Model 2-F with Porcelain Tub

The new Model 2-F Easy Washer illustrated and described in full detail on page 1 of this Merchandiser is full Easy quality in every sense of the word, despite its low price.

The gear case on this new model is identical with that used on the former Model F, which assures a quality of performance rarely found in washers in the price range of the 2-F.

Large hollow wringer rolls, porcelain enameled tub and an enhanced beauty of design make this new Easy a readily salable, eminently satisfactory product for those who cannot be sold the no-wringer Easy—with its many extra labor-saving conveniences.

Easy

Specials Util

Beginning wi Easy Ironer in J Ironer sales hav day—after a fe Finger Tip Cont eminent positio industry.

This unparall possible by the Dealers and the standing and u make the Easy so simple to und strate and so pl

Pure Lin Se

When you are stration of the venir linen tow order from the towels away free sit down at the towel for herself while you have to operate the co job of teaching h can. Remember— an Easy Ironer simple job iron done this new e that though you mediately, if you she will always c does decide to bu

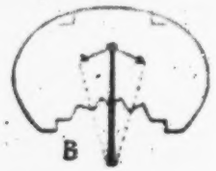
786

The only washer that has Double Action

JUST ponder over this a moment and be sure you understand its complete significance because it is the most important thing in this whole book.

Most women will readily concede the superiority of the oscillating type washer over all others. But it is positively essential that you clearly understand the vast difference between the Figure-8 movement, or Cataraction, of the 1900 Cataract and the motion of the water in all other oscillating washers.

This Action



This Action

The sketches on the right show the two arms that give the Cataraction to the Cataract. If lever "A" were detached, lever "B" would give the tub a single, back-and-forth motion, equal in every way to the oscillating washers having only a *swinging* movement. If lever "B" were detached, lever "A" would give the tub a single up-and-down motion, exactly like the oscillating washers that have only a *rocking* movement.

There is nothing new or patentable about swinging a tub back-and-forth with a lever like "B", or rocking it up-and-down with a lever like "A"—any manufacturer can build an oscillating washer like that. The big, important feature covered by the "1900" patents, however, is the *combining of both these motions at the same time*—Cataraction.

And it is this Cataraction which produces the multiplied effectiveness in the Figure-8 movement of the water. No matter what the makers of other oscillators may claim, (they would all use the double motion if they could), the *1900 Cataract is the only washer having the Figure-8 movement*. True, others may slop the

This is why we call it "Cataraction"

water from end to end, in what looks like a figure 8, when there are no clothes in the tub. But put a batch of clothes in there and try it—then you'll see the difference.

Now let us go back to the first principles of washing and see just what this Cataraction means. Back on page 6 we agreed that the most efficient form of washing is the one that can flush the greatest amount of water through the clothes in a given amount of time, with the least wear and strain on the fabrics.

Since the Cataraction movement dashes the water through the clothes many times as often and with several times the force of other washers, that certainly must mean "*greatest amount of water through the clothes in a given amount of time.*"

And since all this effective cleansing is done inside the perfectly smooth tub of the Cataract without any mechanical devices that rub, pound, tug or twist the clothes, that surely must mean "*least wear and strain on the fabrics.*"

MAKING THE WATER DO MANY TIMES MORE WORK THAN IN ANY OTHER WASHER—moving the clothes comparatively little and that little safely—yet moving them so that the entire surface of every garment is constantly exposed to the hot, sudsy water which forces itself over, under and through every square inch of fabric—thoroughly cleansing every piece with uniform care and not leaving a "streaked" wash—THAT is what the Figure-8 or Cataraction does. And no other washer does anything like it (with the clothes in the water) because the 1900 Cataract patents prevent.

PLAINTIFF'S EXHIBIT No. 56

Page Tightly Bound

Do you want Beauty or Service?

BECAUSE the 1900 Cataract is frankly built to do a machine's work—and that work is to do away with drudgery—it is built strong. Not merely surface beauty, but a practical, sturdy utility with no pretense of being anything but a mighty useful mechanical help to busy women on washday.

Now there are washers which seem to have been designed principally for looks. Indeed some of them seem almost pretty enough to put in the front hallway for admiration.

Bear in mind, however, that the needless ornaments which mask the fact that the washer IS a machine, do not count one cent's worth in the WORK the machine is planned to do—which is to WASH clothes.

Consider the 1900 Cataract for what it is—a wonderful helper, which does washing better, safer and faster than any other washer—but which is, frankly, not intended for a place alongside the piano!

Because that is so, and because making it so also makes the 1900 Cataract the Washer sure to last through years of hard use with least trouble—which is just another way of saying MECHANICALLY GOOD IN EVERY DETAIL—it is equally so that when you buy the 1900 Cataract you are paying for SERVICE—and not one red cent for useless, cumbering, beautifying accessories.

More than a million practical American women have recognized the hard common-sense of that.

Bluing the Clothes

If the clothes are rinsed carefully and dried in the sun, they should remain white and not need bluing. Select the bluing with care. Because the blues vary, it is impossible to give exact amounts. Mix or dissolve bluing in water, and add this solution to the tub of water. Tablelinens and loosely woven materials take bluing more readily than closely woven goods. Shake the rinsed clothes before bluing to prevent streaking, and stir the bluing often. Blue only a few garments at one time and do not allow them to remain long in the water.

How electricity has helped

WITH the advent of electrical power, however, the Company immediately recognized the possibility of employing a method that flushed the water through the clothes instead of using any sort of auxiliary that twisted, tugged, pounded, or otherwise forced the clothes through the water. They believed that nothing should be allowed in the tub except the *clothes* and the *soapy water*, and they set about to design a washer that eliminated the disadvantages of all previous types.

They soon found that by simply rocking the tub back and forth, it would swirl the soapy water through the clothes and wash them with less wear and tear than any other method. This was the beginning of what are now known as "oscillating" washers.

The "1900" engineers, however, were not satisfied with simple "oscillating." They tried swinging the tub to-and-fro, also various ways of rocking it up-and-down. Either method did pretty fair washing and was easy on the clothes, but they wanted something that in addition to being *safe* was much more *rapid*.

After many experiments, they conceived a way to swing the tub forward-and-back and, *at the same time*, rock it up-and-down.

The effect was magical. Instead of merely sliding from one end of the tub to the other, the water suddenly took on life and power. It swirled with tremendous energy, not merely back and forth but was lifted up at the end of each stroke and dashed down through the clothes 80 times a minute with *many times more cleansing force* than in any other type of washer.

This double action or Cataraction principle was immediately patented and is found only in the 1900 Cataract Washer. Its use has never been granted to other manufacturers.

Rinsing the Clothes

Rinse in plenty of clear water and rinse a few things at a time. Rinse the clothes in hot water, since cold water would extract the fibres and harden on them the soap particles. If desired, a scalding rinse can be easily given in the clothes washer. Insufficient rinsing causes uneven setting of the blue, which in combination with the alkalinity of the soap, may, upon ironing, form rust-stains. Soap or washing-soda left in the fabrics weakens them. Soften the rinse-water if necessary, with borax or ammonia, rather than washing-soda, which is too strong an alkali to allow to remain in the cloth.

Page Tightly Bound

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No. 738,560. PATENTED SEPT. 8, 1903.

W. S. MILLER.

WASHING MACHINE.

APPLICATION FILED MAY 23, 1903.

NO MODEL.

Fig. 1

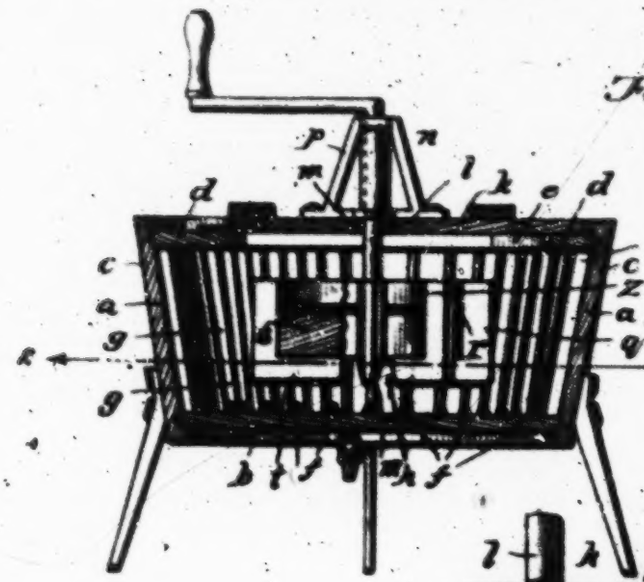


Fig. 4.

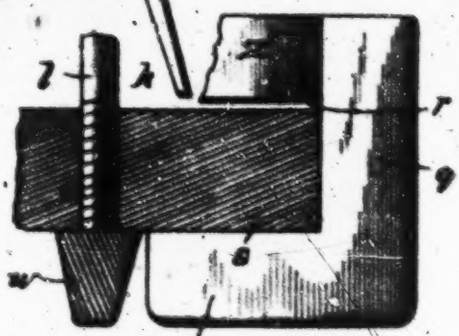
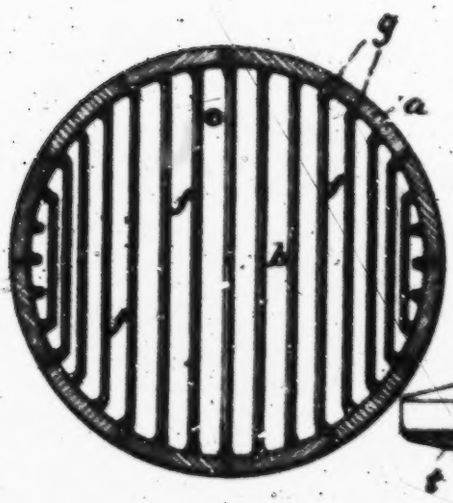
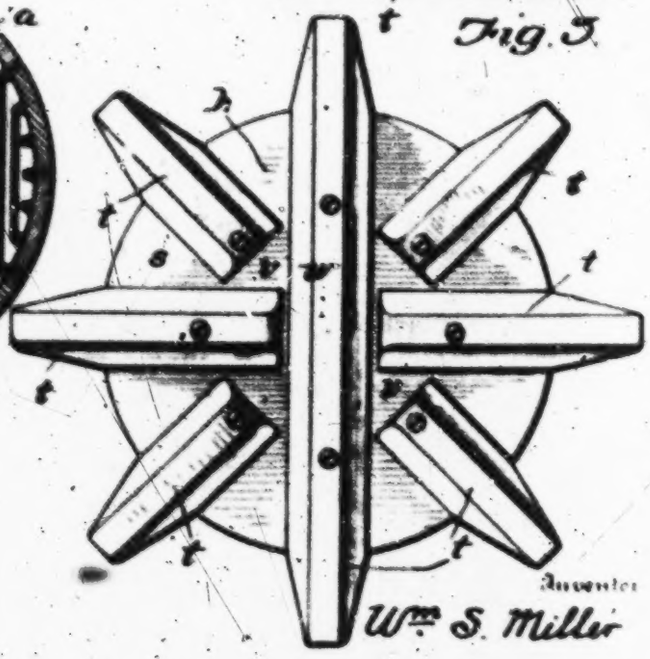


Fig. 2.

Fig. 3.





Witnesses

R. A. Boswell

Geo. M. Anderson

Inventor

Wm. S. Miller

By E. W. Anderson

Its Attorney

No. 738,560. Patented September 8, 1903.

UNITED STATES PATENT OFFICE.

WILLIAM S. MILLER, OF MEYERSDALE, PENNSYLVANIA.

WASHING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 738,560, dated September 8, 1903.

Application filed May 23, 1903. Serial No. 158,478. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM S. MILLER, a citizen of the United States, and a resident of Meyersdale, in the county of Somerset and State of Pennsylvania, have made a certain new and useful Invention in Washing-Machines; and I do declare the following to be a full, clear, and exact description of the same, such as will enable others skilled in the art to which it appertains to make and use the invention, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

Figure 1 is a central vertical section of the invention. Fig. 2 is a section on the line 2 2, Fig. 1, with the agitator removed. Fig. 3 is a bottom plan view of the agitator. Fig. 4 is a fragmentary detail view, partly in section, of a portion of the agitator.

The invention relates to washing-machines; and it consists in the novel construction and combinations of parts, as hereinafter set forth.

In the accompanying drawings the letter *a* designates the receptacle or tub having a bottom *b*, side wall *c*, and top *d*, the latter being secured to the upper portion of the side wall and being provided with an opening *e* for the introduction of the agitator, the clothes or articles to be washed, and the water. To let out the water, a waste-opening having a stop or valve is provided in the bottom portion of the tub. The upper surface of the bottom of the tub is provided with a series of small ribs *f*, which are placed near each other with narrow intervals between these ribs, being usually of somewhat narrowed form from their bases to their tops or upper surfaces. The side wall of the tub on its inner surface is also provided with a series of ribs *g*, extending upward from the bottom, said ribs having small intervals between them. These ribs are also preferably designed to have their bases wider than their inner surfaces, being somewhat tapering or beveled on their sides.

The cover is indicated at *k*. It is hinged to the top of the tub and is of sufficient strength and extent to carry the rotary agitator *h*, which is provided with a stem or shaft *l*, which extends through a bearing in the center of the cover, said bearing consisting not only of the opening *m* in the center of the cover, but also of a casting *n*, which is secured by its arms *p* to the top of the cover and projects above the latter sufficiently to give firmness of position to the shaft of the agitator. The journal portion of the latter is, however, somewhat longer than the bearing in order that it shall be capable of a certain amount of vertical or up-and-down adjustment while in operation in order to accommodate itself easily to the quantity of the articles being washed and also to the inequalities of thickness thereof, which arise constantly from their change of position. The bottom of the stem of the agitator is firmly secured in or to the center of the disk *s*, the bottom of which is provided with a series of deep radial trapezoidal ribs *t*, between the inner ends of which are openings *v*. These ribs have their sides inclined toward each other from their bases to their bottoms, so that the intervals between them will become narrower toward the disk-bottom, thereby facilitating the rubbing action of the ribs. Around the side or circumference of the disk are the upright trapezoidal ribs *q*, of the same depth as the radial ribs and also arranged in series and being preferably connected each at its lower end by careful jointing or mitering (not shown) to the radial ribs of the disk-bottom. In this way each rib is, in effect, of L form, the circumferential ribs serving to direct the water toward and into the channels between the radial ribs of the disk-bottom. These circumferential ribs are designed to extend upward to the bottom of the cover when the agitator is raised to its highest position, and in order to give them proper security of position and due firmness, as well as to prevent the articles being washed from moving past them to the middle of the agitator over its disk-bottom, the agitator is provided with an annular band or hoop *z* above the circumferential portion of the disk and within the series of upright ribs. To this band or hoop the upper portions of these upright ribs are firmly attached. The rubbing is effected by the action of the side and bottom ribs of the agitator in conjunction with the side and bottom ribs of the tub, and this rubbing, in connection with the rush of the

water as the agitator is turned within the tub and the squeezing action effected by the up-and-down movement of the agitator, is designed to cleanse the articles in the tub in a satisfactory manner. The top of the stem of the agitator is provided with a crank-handle or other device for turning. When the cover is closed, the agitator is in proper centralized position in the tub. When, however, the cover is raised, the agitator is entirely withdrawn from the tub, so that free access can be had to its interior. When raised, the water in the agitator escapes freely through an opening, as at r, in its lower portion, the opening in the construction shown being between the hoop and the disk-bottom.

It is designed in this washing-machine to make the operating-ribs of the agitator much larger in cross-section than those of the bottom and side of the tub—that is to say, they project outward from their bases to a greater extent, even double or more than double the extent of the ribs of the tub itself. In this way they serve a better purpose in their action in moving the water and the clothes.

Having described this invention, what I claim, and desire to secure by Letters Patent, is—

1. In a washing-machine, the rotary agitator, consisting of the disk-bottom, its operating-stem, and the annular band above its circumferential portion, the deep radial ribs on the disk-bottom, and the similar upright side ribs connected at their lower ends with said radial ribs, and at their upper ends to said annular band, substantially as specified.

2. In a washing-machine, the combination with a tub, having the interior surfaces of its bottom and side wall provided with series of ribs, and the hinged cover of said tub having a central upward-projecting bearing, of the rotary agitator, having deep L-form ribs on its bottom and side, and a strengthening-band above its bottom, and the reciprocating stem-journal longer than said bearing, substantially as specified.

In testimony whereof I affix my signature in presence of two witnesses.

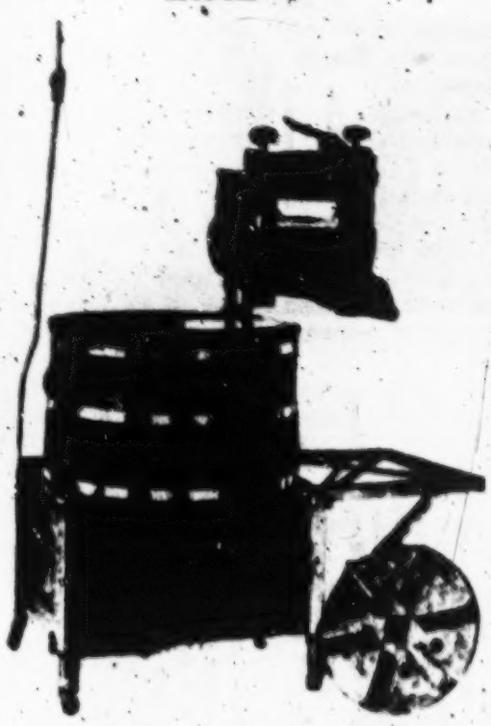
WILLIAM S. MILLER.

Witnesses:
ELLSWORTH G. NAYLOR,
FULTON N. SHIPLEY.

PLAINTIFF'S EXHIBIT" No. 88

792

MODEL "J"



Iron Short Bench, with folding extension for extra tub; Electric Motor, Swinging Wringer, with Cut Gears under tub.

"The Home Model"

The Better Kind of Washing Machines.

★ MODEL J. ★

From every section we hear that people are now calling THE MODEL "J" Electric Washer the best we have ever built. In this sense the reports we are continually receiving are really remarkable.

We have not been conscious of an especial effort to make this Model "J" Washer, in specific detail, better than the others.

The improvements we make from time to time are simply in pursuit of our policy always to build a product worthy, in every way, of the confidence we invite our buyers to place in it.

Every Home Model is guaranteed to give satisfaction.

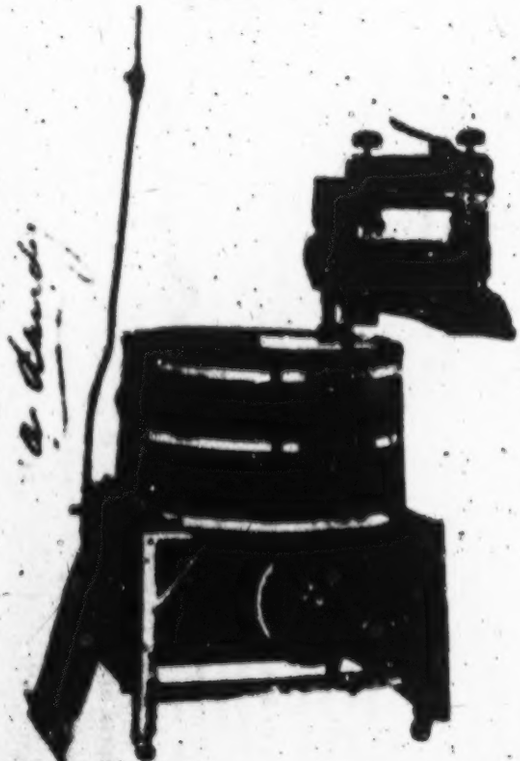
Miller Manufacturing Company

MEYERSDALE, PA.

C. F. JENKINS, Manager. Write for Prices.

(Over)

MODEL "J"



Iron Short Bench, with folding extension for extra tub; Electric Motor, Swinging Wringer, with Cut Gears under tub.

It's Easy On Clothes

The "Home Model" Type J, Electric Washing Machine gets all the dirt out of the clothes in a scientific way.

Instead of being worked and torn by a "dolly", the clothes are gently carried by the agitator over a rubbing board. The agitator automatically adjusts itself to the amount of clothes in the machine.

It has an independently-operated, safety-swinging, reversible wringer; only two gears, both thoroughly protected; a self-oiling device for the under gear parts; and a Westinghouse Motor.

Write for our Dealer Proposition.

Miller Manufacturing Company

C. F. JENKINS, Mgr.

Page Tightly Bound

Mothers appreciate the Haag Vortex

The Mother who has a Haag Vortex Washer has no worries about the kiddies clean clothes. And it does not matter how deep the dirt grinds nor how badly they are soiled, for they are easily and quickly washed.

Another thing Mother appreciates is the fact that she can wash a few pieces at a time with no trouble at all. For although the machine has a large capacity, its work is done just as effectively if you wash only a few towels.

Simply drop the clothes into the tub with just enough water to cover them and the washing is accomplished in just a few moments. No bother to it—the old drudgery is converted into a real pleasure with the Haag Vortex.

Mechanically Perfect

All the mechanism of the Haag Vortex Washer is in one compact unit securely attached to the frame and completely covered —no exposed parts. The slow moving, silent, machine cut gears transmit the power direct from the ¼ H.P. motor to washer and wringer. The motor and wringer each have two oil holes, while the balance of the moving parts have oilless bearings, with the exception of the main gears which run in hard oil.

The motor is mounted on a wood base, providing complete insulation.

Supplied with ten feet of cord and plug for attaching to electric socket.

Easy to Clean

The smooth, simple construction makes this Washer exceptionally easy to clean. No cracks and corners to catch dirt. The smooth highly polished copper tub only needs to be wiped off to renew its brilliant lustre after use. No cylinder to clean—just drain and wipe dry with a cloth. The Vortex lifts right out giving easy access to the interior. The large 2 inch smooth rolling casters make it exceptionally easy to move the washer, even when full.

Gas Burner

For those who want to heat the wash water right in the tub, a special gas burner is attached. This unit is built on the same principle as a gas stove, concentrating the heat and giving maximum efficiency. This feature is supplied as an extra only when specified.

Why You Should Choose the New Haag Vortex

1—Cleans thoroughly, quickly, efficiently.
2—Handsome in appearance.
3—No wear and tear on clothes.
4—Economical to operate.
5—Easy to clean.
6—No danger from moving parts.
7—Simple in design.
8—Sturdy in construction.
9—Quiet—no vibration.
10—"A Lifetime of Carefree Service."

A demonstration of the New Haag Vortex will quickly prove all that is claimed for it—and more. Let us show you what this new Washer will do.

PLAINTIFF'S EXHIBIT No. 89

The NEW HAAG VORTEX

The New Haag Washer

With the advent of the new principle embodied in the New Haag Vortex Washer comes a greater freedom from washday worries than has ever before been enjoyed by the housewife. For it is a new principle—a better way—a more efficient method of washing clothes, taking out every vestige of dirt without rubbing—without injury to the most delicate fabric.

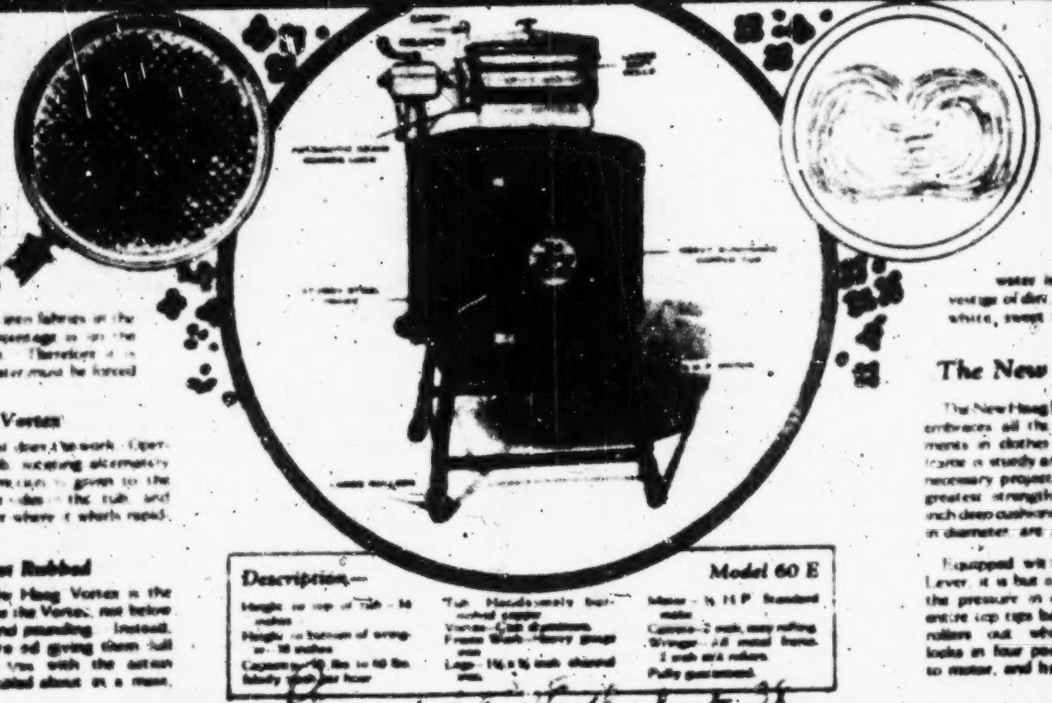
As cloth, like ordinary window screening, is made up of small squares made up by the interlacing thread. (The accompanying illustration shows a piece of fabric under the magnifying glass.) You've no doubt noticed how dirt collects in the tiny squares of your screens—in, not on the surface. Dirt gets into fabrics in the same way. Only a very small percentage is on the surface. Most of it is in the mesh. Therefore it is clear that to remove this dirt the water must be forced through the fabric.

The Haag Vortex

The New Haag Vortex is what does the work. Operating at the bottom of the tub, revolving alternately back and forth, a peculiar motion is given to the water, forcing it up along the sides of the tub and drawing it down at the center where it whirls rapid- ly back and forth.

Clothes are Not Rubbed

Another feature of the New Haag Vortex is the fact that the clothes are above the Vortex, not below it. They are not subjected to a continuous rubbing and pounding. Instead, the cone shape of the Vortex keeps the clothes separated giving them full benefit of the motion of the soapy water. Contrast this with the action of the ordinary washer in which the clothes are tumbled about in a mass, closely packed together, preventing the water from being forced through the mesh of the fabric. The action of the Haag Vortex Washer is so thorough, so efficient, that even the deepest seated dirt cannot withstand it. Through and through, back and forth, the foamy, soapy water is forced, removing every vestige of dirt leaving the clothes clean, white, sweet smelling.



Description—	Model 60 E
Height to top of tub—34 inches	Tub Handsomely hardwood copper
Height to bottom of wringer—58 inches	Vortex—Cast aluminum.
Capacity—10 lbs. to 40 lbs.	Frame Black Heavy gauge iron
Legs 16½ inch cabinet iron.	Motor—½ H P Standard make
	Gasoline 2 inch, easy rolling
	Wringer—All metal frame, 3 inch size rollers.
	Pulley guaranteed.

The New Haag Wringer

The New Haag Metal Wringer (Patented) embraces all the most modern improvements in clothes wringers. The all metal frame is sturdy and compact, free from unnecessary projections and designed to give greatest strength and efficiency. The 12 inch deep cushioned rubber rollers 3 inches in diameter are unusually long lived.

Equipped with the New Haag Safety Lever, it is but a second's work to release the pressure in case of emergency. The entire top tips back making it easy to lift rollers out when necessary. Wringer locks in four positions, is geared directly to motor, and has easy, handy control.

Showing the new Haag wringer. Note compactness and large dirt rolls.

In case of emergency the top and entire top back, and release rolls.

Removing or replacing the rolls is easy. You simply lift them out.

HAAG BROS. CO. PEORIA, ILL.

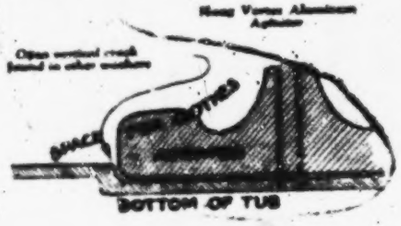
Fast Washing Made Safe
An Exclusive Haag Feature

THE exact shape of the Haag Vortex agitator is of primary importance in the gentle rapid handling of your washing. This perfected agitator is the result of over three years of constant experiment. In the Haag Vortex washer you have an agitator which does not coax nor tangle clothing, which creates a water movement which will clean the dirtiest clothing by keeping clothing separated and forcing soap suds thru the mesh of the fabric.

It was Haag Brothers Company—the pioneers—who discovered and patented the Haag Vortex Flanged Agitator construction which eliminates the open vertical crack at the base of the agitator which is so destructive to delicate garments.

As indicated by the illustration on this page, the Haag Vortex agitator is capped over a raised base plate which is stamped in the tub bottom. In the Haag Vortex there is no danger of delicate fabrics working down into an open crack and being ground between metal surfaces. Nor is there danger of buttons catching in such an opening and jamming the agitator—thereby burning out the motor and necessitating expensive repairs.

Haag Vortex Aluminum Agitator



THE HAAG VORTEX IS SAFE

New, More Convenient Haag Wringer

THE famous Haag Wringer has been improved—simplified in construction and refined in appearance. It's a smooth finish all metal gray enameled frame, easy to keep clean. Durable soft rubber rolls—removable either—tools—operates on tallow-sealed ball needle oil-less bearings. There will be no crushed buttons and no oil stained garments. The new Haag Vortex Wringer has a double drainboard—heavily nickeled—one section of which is stationary, and the other reversible. This is an added convenience women appreciate. A convenient, positive acting tension release makes the Haag Wringer safe. Knobs are of Bakelite.

Other Haag Models

There is a Haag Model to suit the convenience and means of every home, low-priced models, models equipped with gasoline motors, models having a pulley for use with a stationary farm engine. If for any reason the Haag Vortex Electric does not please you, ask the dealer about the other Haag Models.

Ask for a Free Demonstration

PLAINTIFF'S EXHIBIT No. 80

65

562

EASIER, QUICKER, CLEANER WASHING — HAAG — NO TANGLING, NO SOAKING, NO RUBBING

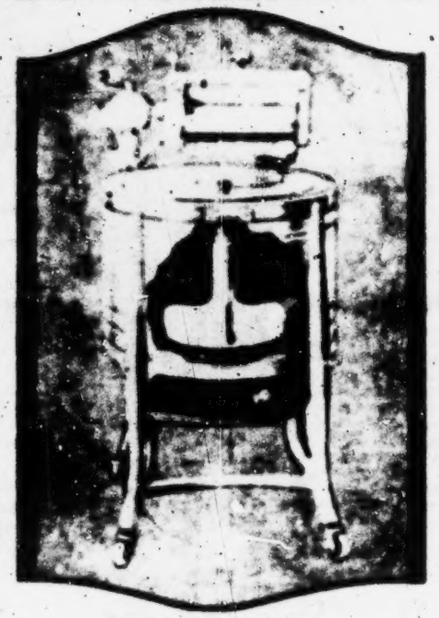
The Haag Vortex — Women's Choice!

The New Principle — A Better Way

Dirt is in the Mesh. The Haag Vortex Gets It Out

FEATURES

1. Smooth-finish all-metal swinging reversible wringer, locking in all five positions, finished in gray enamel, convenient and easy to keep clean.
2. Cast hardened stainless rust proof gears. Noiseless and long wearing.
3. Double drum board—heavily polished—one part sanitary and the other adjustable—very convenient.
4. Hinged top, convenient, positive, tension releases.
5. Beautiful new double rub—thorough construction—heavy copper nickel lined. Quite smooth, non-corroding, exterior, easy to clean and keep clean. Strong galvanized iron jacket around copper tub makes dent proof exterior. Dead air space between tub and jacket keeps water hot longer—aids washing. Enamel gray like wringer and frame.



BEAUTIFUL—
A Washer to be Proud of

FEATURES

6. Oversize soft rubber rolls—do not crush buttons nor wrinkle clothes excessively—get wrung dry—finish rolls can be kept free of lint, easily without tools. Rolls operate on hollow steel shaft, with simple bearings—no grease soiled garments.
7. Light, strong steel aluminum tub—this rubber ring allows—will hang on side of tub when not in use—upon aluminum splash ring.
8. Cast aluminum agitator mounted over base plate. Fast washing made safe. (See next page.)
9. Heavy bronze corner post screws down on soft lead gaskets against heavy base.
10. Standard motor ½ h. p. electric motor
11. Simple trouble-free four cam all machine cut gears—graphited oil-less bronze bushings, steel worm—ball bearing steel drive shaft.
12. Large, easy rolling casters—washer can be moved easily when needed.

Simplicity — Durability

LONG years of experience in manufacturing fine electric washers has resulted in the extreme simplicity of Haag Vortex construction. No washer made has fewer moving parts to get out of order. No washer needs less oiling. It is no exaggeration to say that the Haag Vortex offers you A lifetime of care-free service.

Quality of material and perfect workmanship have ever been of paramount importance in building Haag washers. Nothing in the way of quality, or efficient operation is ever sacrificed to design or price. Haag washers are noted for their steadiness, service free convenience operation, and you will never have occasion to refer to the guarantee bond which accompanies all Haag Washers.

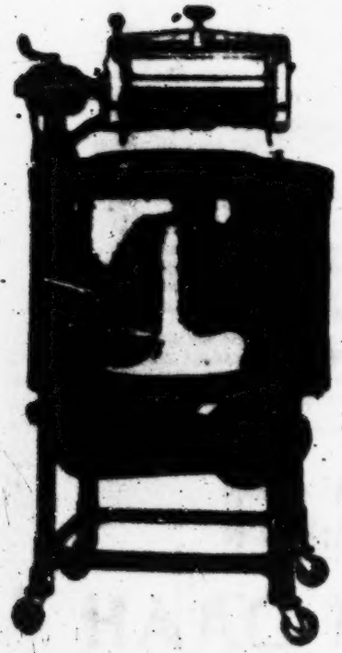
HAAG BROS. CO. — PEORIA, ILLINOIS

797

PLAINTIFF'S EXHIBIT No. 61

Are You A Guesser ?

—or do you select the Washing Machine you sell by actual competitive test?



BEST BY ACTUAL TEST

THREE prominent washing machine men recently visited the big Haag factory to make some suggestions. They thought they wanted a square tub, for instance, and several other well known features. But they were guessing, as they later admitted.

By actual competitive demonstration of the Haag Vortex, these men convinced themselves, point by point, right in the Haag factory, that the washing action of the Haag Vortex could not be materially improved upon.

Should you make this same test you would prove to yourself beyond dispute—as they did—that:

The New HAAG VORTEX

1. The Haag Vortex does not tangle clothing, but other types of agitators do tangle.

2. In other agitator washers, the whole load of clothing has a tendency to bunch around this center post where there is little washing action, while in the Haag Vortex the clothes are kept spreading freely at the outer edge of the tub where the water action is greatest. The Vortex, therefore, must obviously wash faster and more thoroughly than the others.

3. A round tub develops a far more uniform and consistent circulating action than a square tub because any kind of corners in the tub, by natural law, get less water action.

4. No washer made has larger laundry capacity than the Haag Vortex.

5. The load of clothing which fully occupies the space of other well known makes of washers is handled silently and easily by the Haag Vortex washing at the same speed.

6. Only in the Haag Vortex is the agitator positively locked down so that it cannot climb. In other agitator washers the tub is lifted by the water flow—the agitator is likely to climb out of place and later drop back on garments.

The Haag Vortex does all more easily because, honestly, it does better work.

Let us send you our booklet, "Differences That Mean Dollars to You." You will find in it not only a complete and vivid description of Haag Washers, but general information also which will be of real value to you. Drop us a post card asking for "Differences."

1 67

HAAG BROS CO., Peoria, Ill.

New! New!

List Price $125

List Price $125

A Washer That Is Easier to Sell Than to Sell Against!

Look at the picture—note the lines and clean-cut appearance.

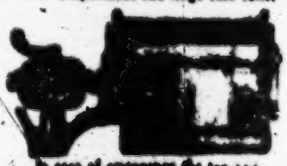
Look at the cast-aluminum "vortex" shown above—and see just what a disturbance it makes in the suds!

Look at the wringer shown here—and think what a help it is to salesmen when they are "selling a prospect" on this HAAG VORTEX.

Look at the price—and remember that this washer comes from the plant of "George" and "Al"—who have never yet allowed cheapness to enter into a single product of theirs.

Look back upon the reputation of this firm for the past 15 years—it shows that they have consistently made GOOD washers—the kind that stays "sold" without expensive "servicing" on the part of their dealers.

Showing the new Haag wringer. Note compactness and large rack rolls.



In case of emergency the top can quickly be lock and release roll.

Handling or replacing the rolls is easy. You simply lift them out.

For a sure demand for 1925, get this line for your town. The exclusive "vortex" resting at the bottom of the large [illegible] burnished copper tub whirls the fabrics into the suds so energetically that complete cleanliness is attained in a remarkably short time.

It is the old "dolly" principle vastly improved and with the "rubbing" eliminated. It will be one of America's most popular washers in 1925 and it will bring new glory to the name of Haag Brothers—and profits to Haag dealers.

Write For Our Dealer Proposition—
We Make a Complete Line of Washers.

HAAG BROS. - Peoria, Ill.

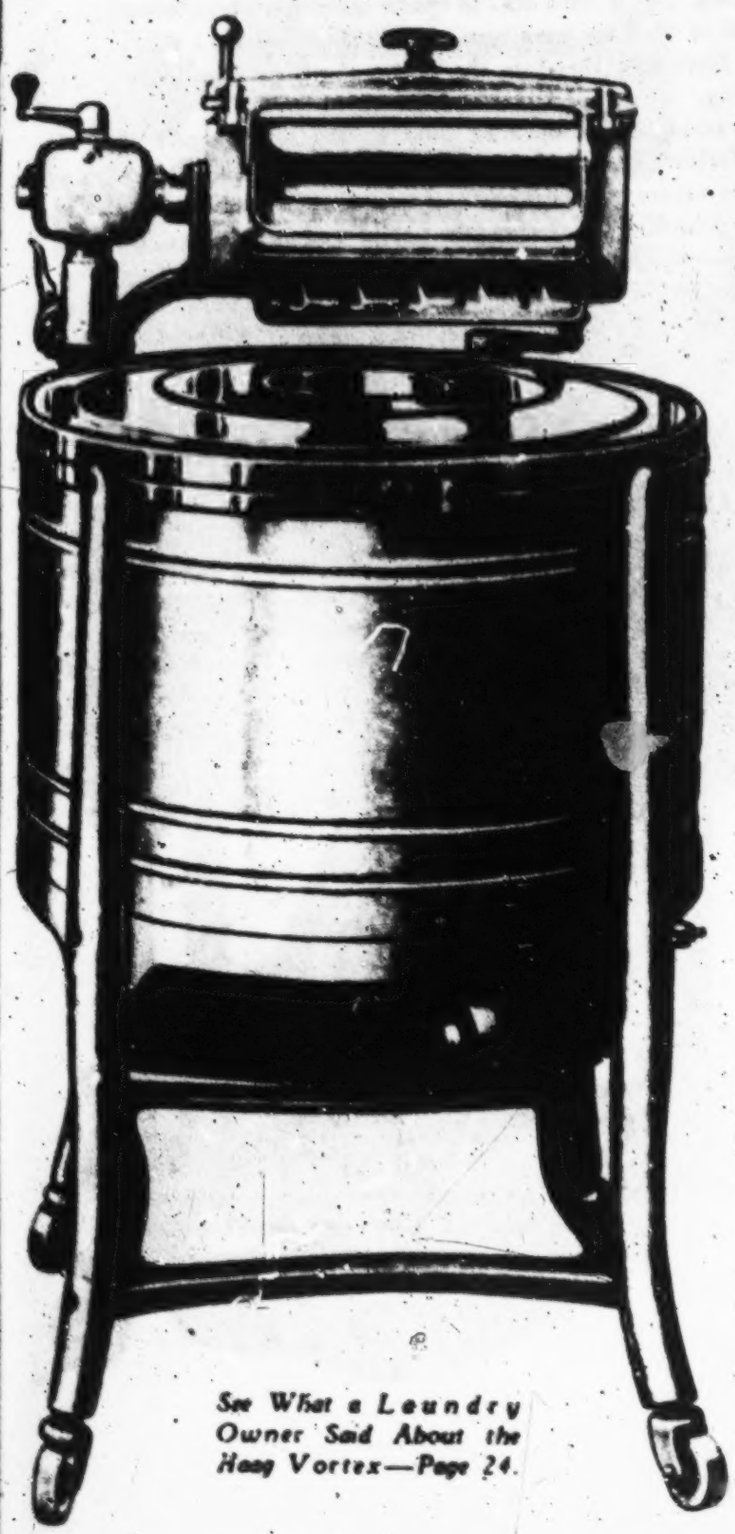
Makers of Washers That Stay Sold Without Servicing.

HUBER BROS., Minneapolis, *Northwestern Distributors*

PLAINTIFF'S EXHIBIT No. 63

799

Haag Washing Machines—



See What a Laundry Owner Said About the Haag Vortex—Page 24.

HAAG

Model 70-E

Because of its perfect operation and efficiency, the Haag Vortex has gained tremendous popularity among women since its perfection two years ago. Haag Vortex sales have more than tripled in the past two years, and will doubtless increase in an even greater percentage in 1927. These increases are due to greater sales by existing Haag dealers rather than to the addition of a large number of new dealers. The extensive national newspaper campaign, which will appear in 1927, will increase the consumer acceptance of the Haag Vortex at least 100%.

While it is practically impossible to improve upon the operation and principle of the Haag Vortex, the 1927 Model has been refined in appearance and construction, and features have been added which make it *much* more desirable than even the 1926 Haag Vortex.

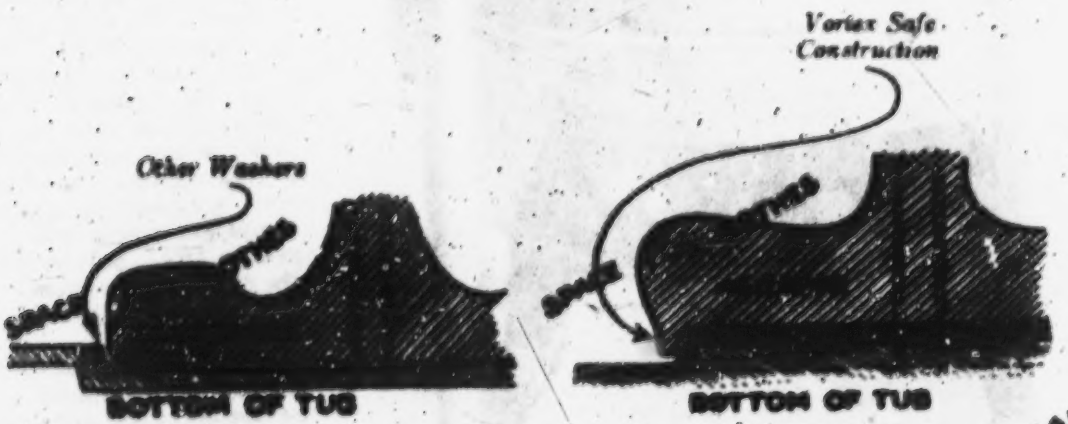
Women Demand Fast, Thorough, Safe Washing

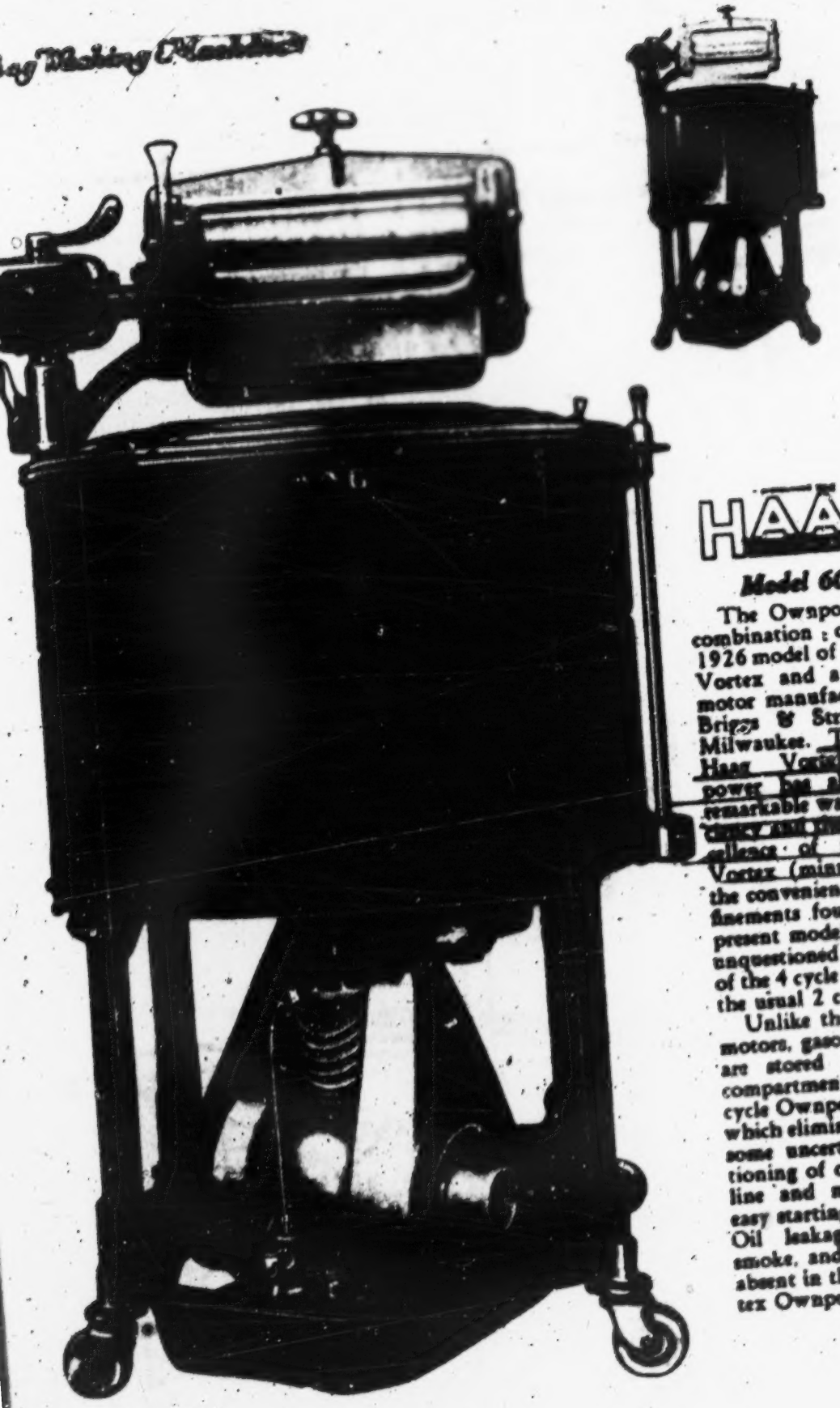
The Haag Vortex without any preliminary soaking or hand-rubbing afterwards, washes cleaner in 4 to 7 minutes than any other type of washer can wash in 30 minutes, and with less wear per washing. The Vortex does of course show more wear on clothing per hour because clothes left in an hour have been washed clean not once but 9 to 15 separate and distinct times. Naturally, therefore, the Vortex shows more wear on clothes per hour, but less per washing.

In the Haag Vortex washing is accomplished only by the water which actually passes thru the mesh of the fabric. The aim of all washing appliances is to force more water per second thru a given square inch of fabric, but the old style washers all defeated their own aim by rolling or pounding the clothes into a solid wad so that washing could only take place with 100 per cent efficiency on the outside of the wad or ball of clothing. In the Haag Vortex, on the other hand, the clothing is kept fully separated at all times by the action of the agitator so that every piece of clothing is washed with equal thoroness at one time.

The Exclusive Haag Safety Feature Gives Protection to Dainty Fabrics

One of the famous Haag patents gives Haag Brothers Company the exclusive right to use an agitator having the construction at its base shown in the accompanying drawing. The Haag agitator, which is cupped over a brass base plate, eliminates the open vertical crack around the base of the agitator found in other washers. With this vertical crack eliminated in the Haag Vortex, there is no danger of delicate fabrics working down and being ground between the moving metal surface—nor can buttons catch and jam the agitator.





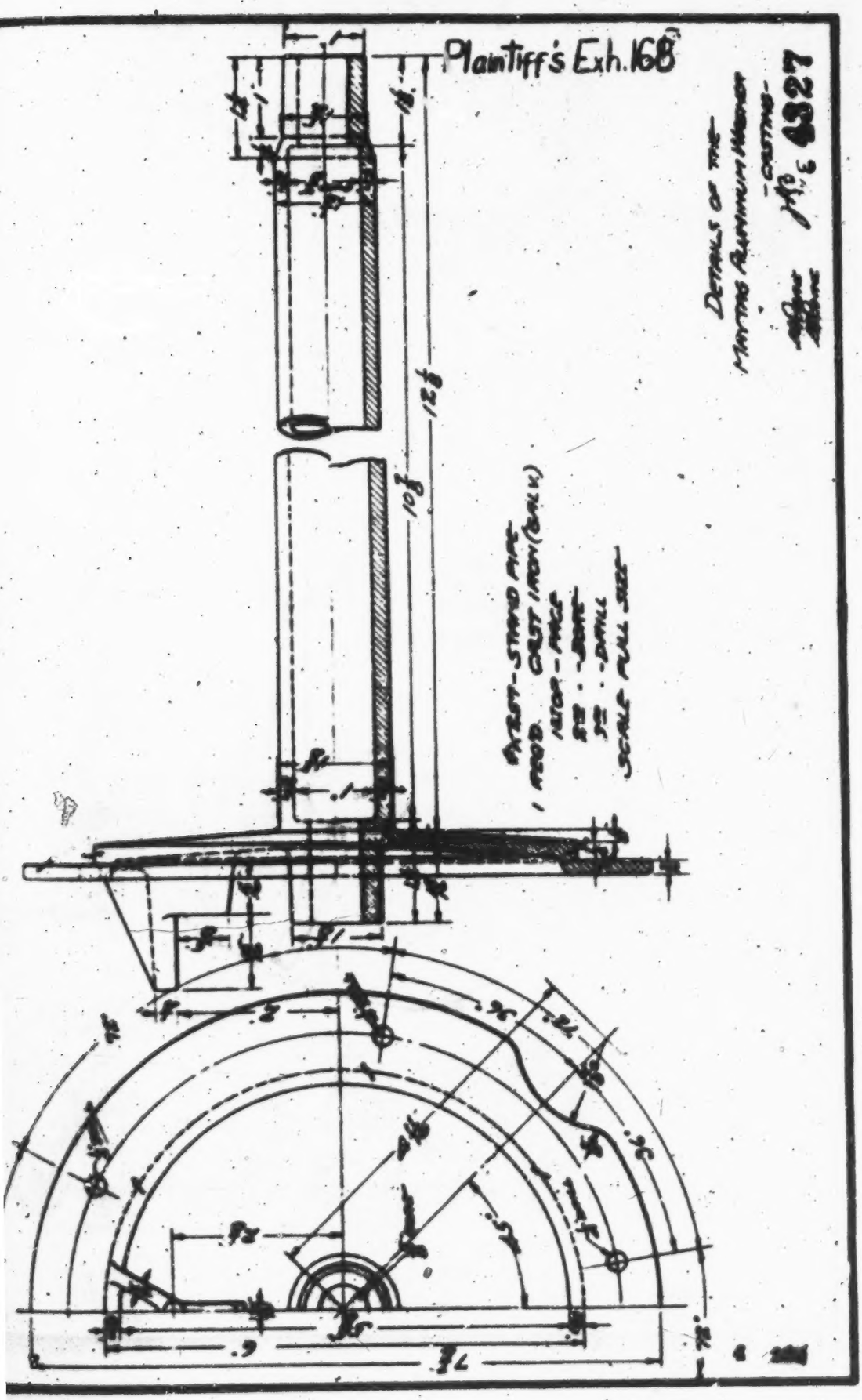
HAAG

Model 60-G

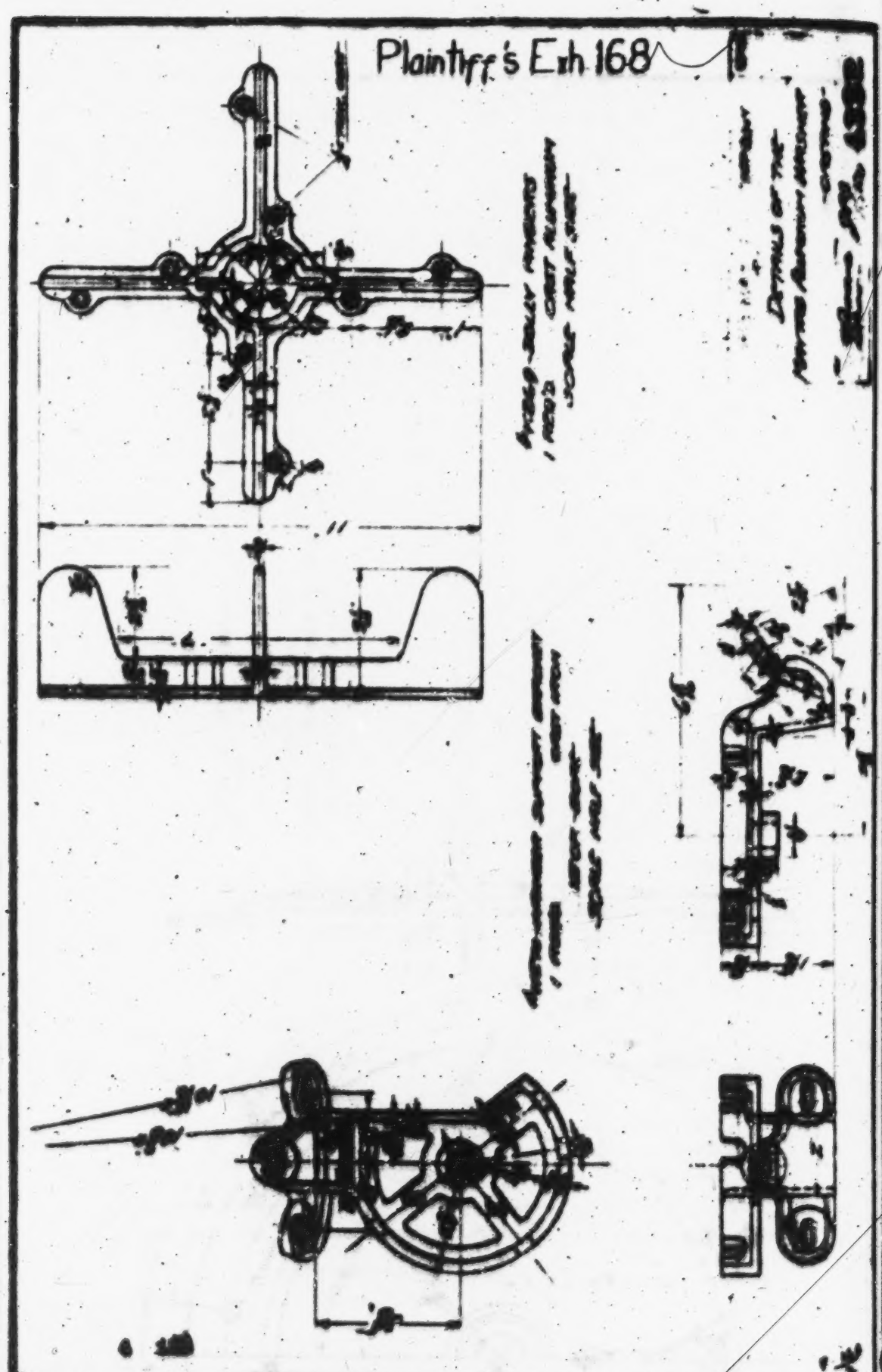
The Ownpower is a combination of the 1926 model of the Haag Vortex and a 4 cycle motor manufactured by Briggs & Stratton of Milwaukee. Thus the Haag Vortex Ownpower has all of the remarkable washing efficiency and the many excellences of the Haag Vortex (minus some of the conveniences and refinements found on the present model) plus the unquestioned superiority of the 4 cycle motor over the usual 2 cycle motor.

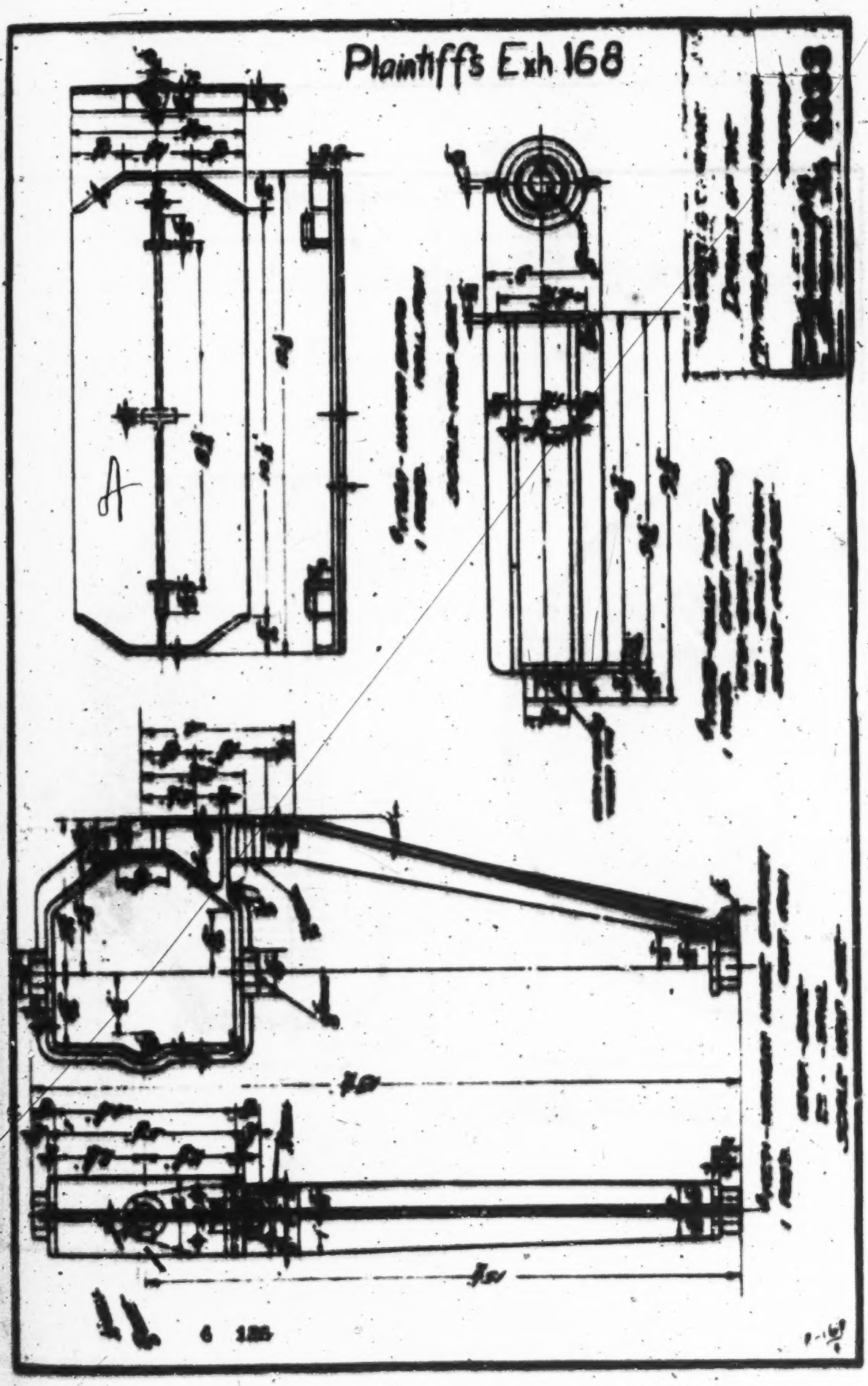
Unlike the two cycle motors, gasoline and oil are stored in separate compartments in the 4 cycle Ownpower motor, which eliminates bothersome uncertain proportioning of oil and gasoline and makes quick, easy starting a certainty. Oil leakage, noise, smoke, and batteries are absent in the Haag Vortex Ownpower.

PLAINTIFF'S EXHIBIT No. 168 802



Plaintiff's Exh 168




Plaintiff's Exh. 168
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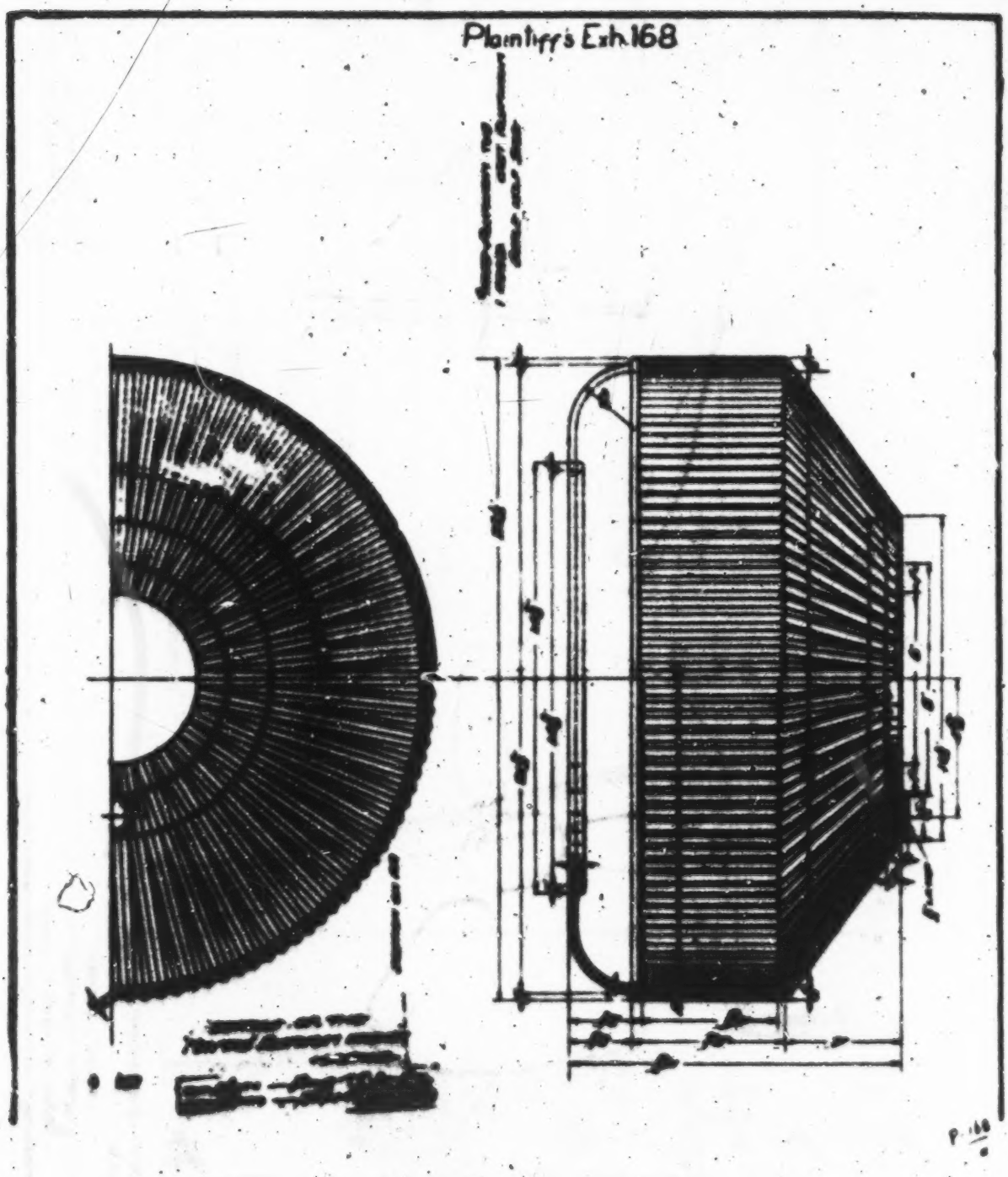
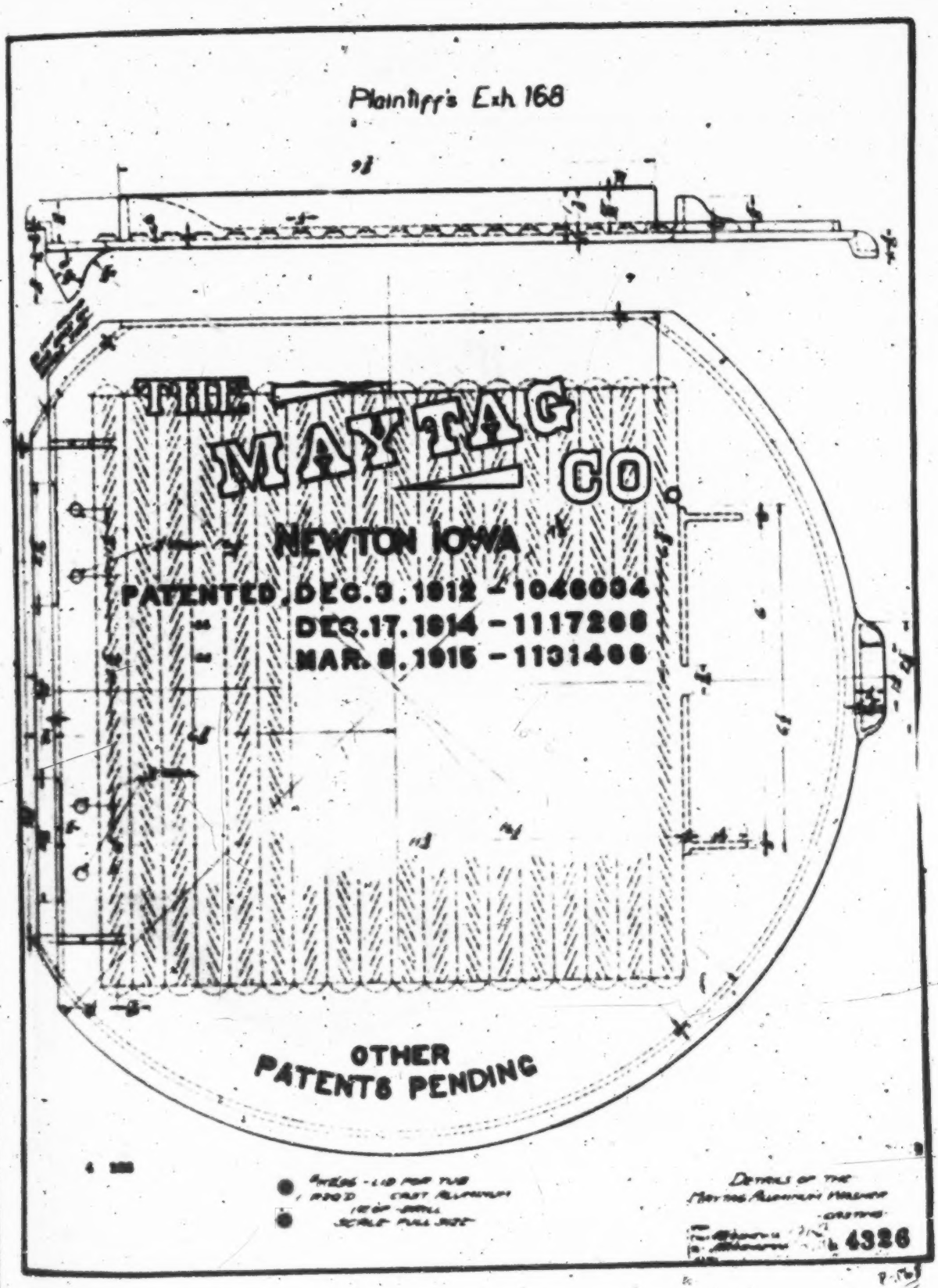

Plaintiff's Exh. 168

Plaintiff's Exh 168



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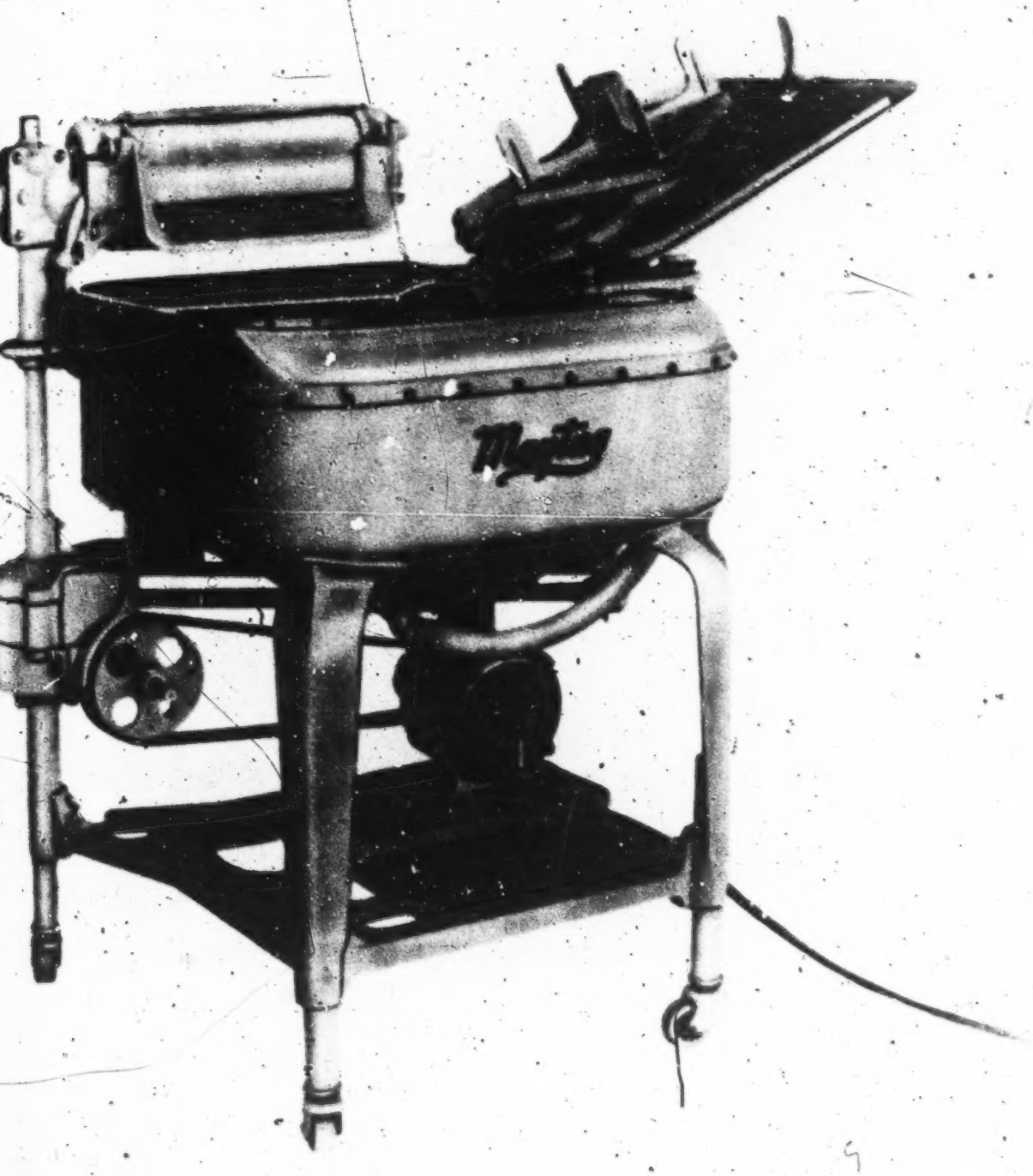
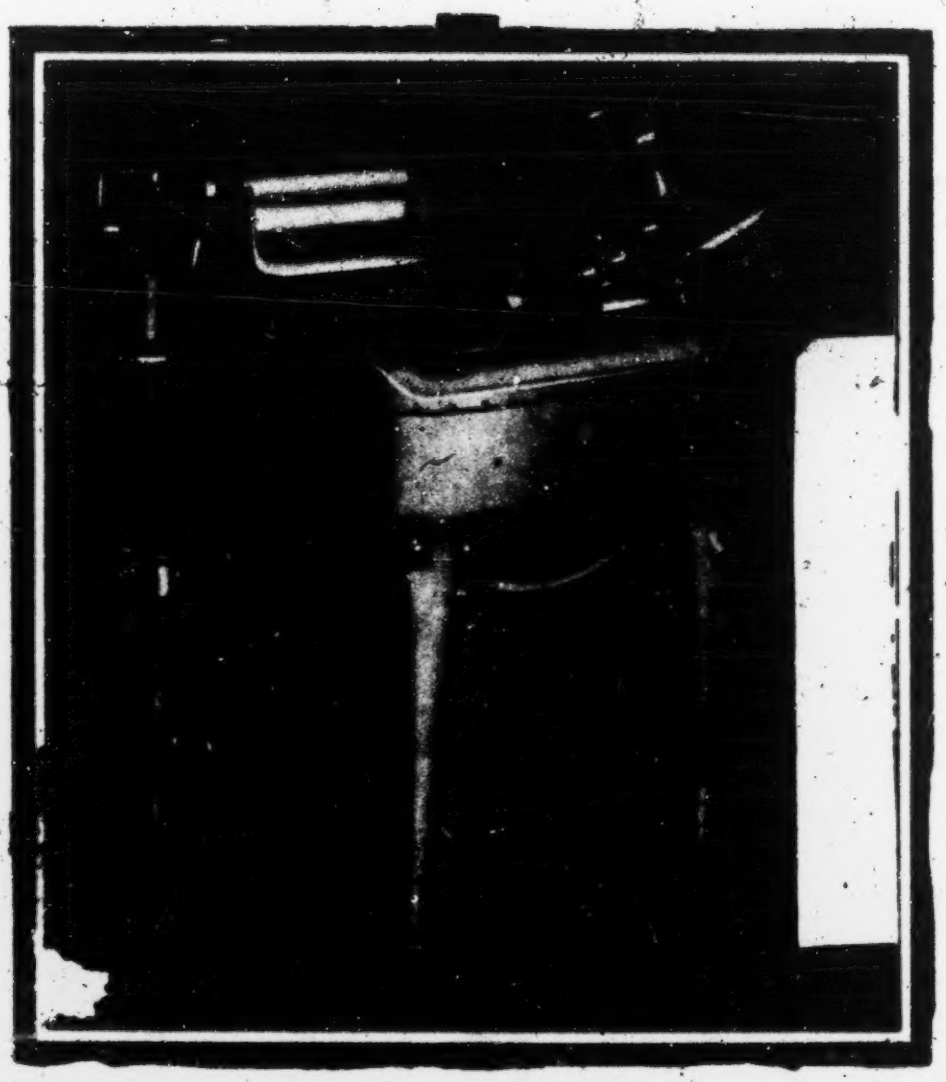


8007

PLAINTIFF'S EXHIBIT No. 170 D

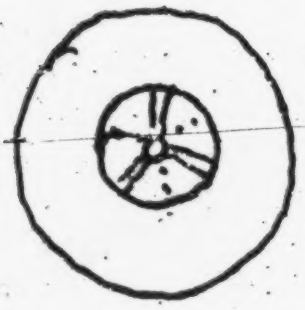
808

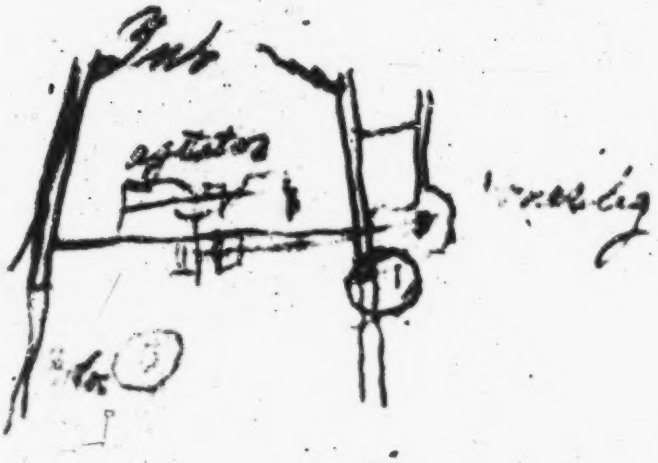


808

PLAINTIFF'S EXHIBIT No. 171

White-Built 1920 - agitator.





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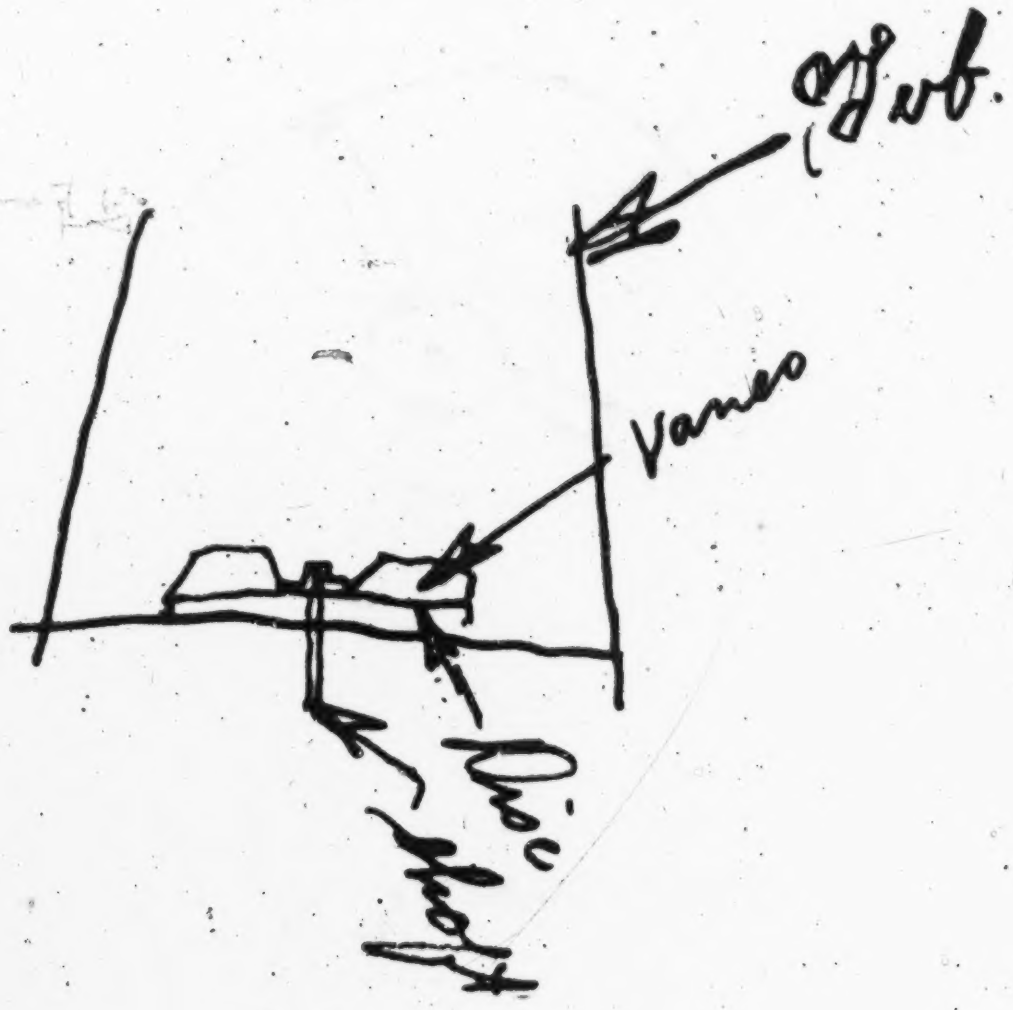

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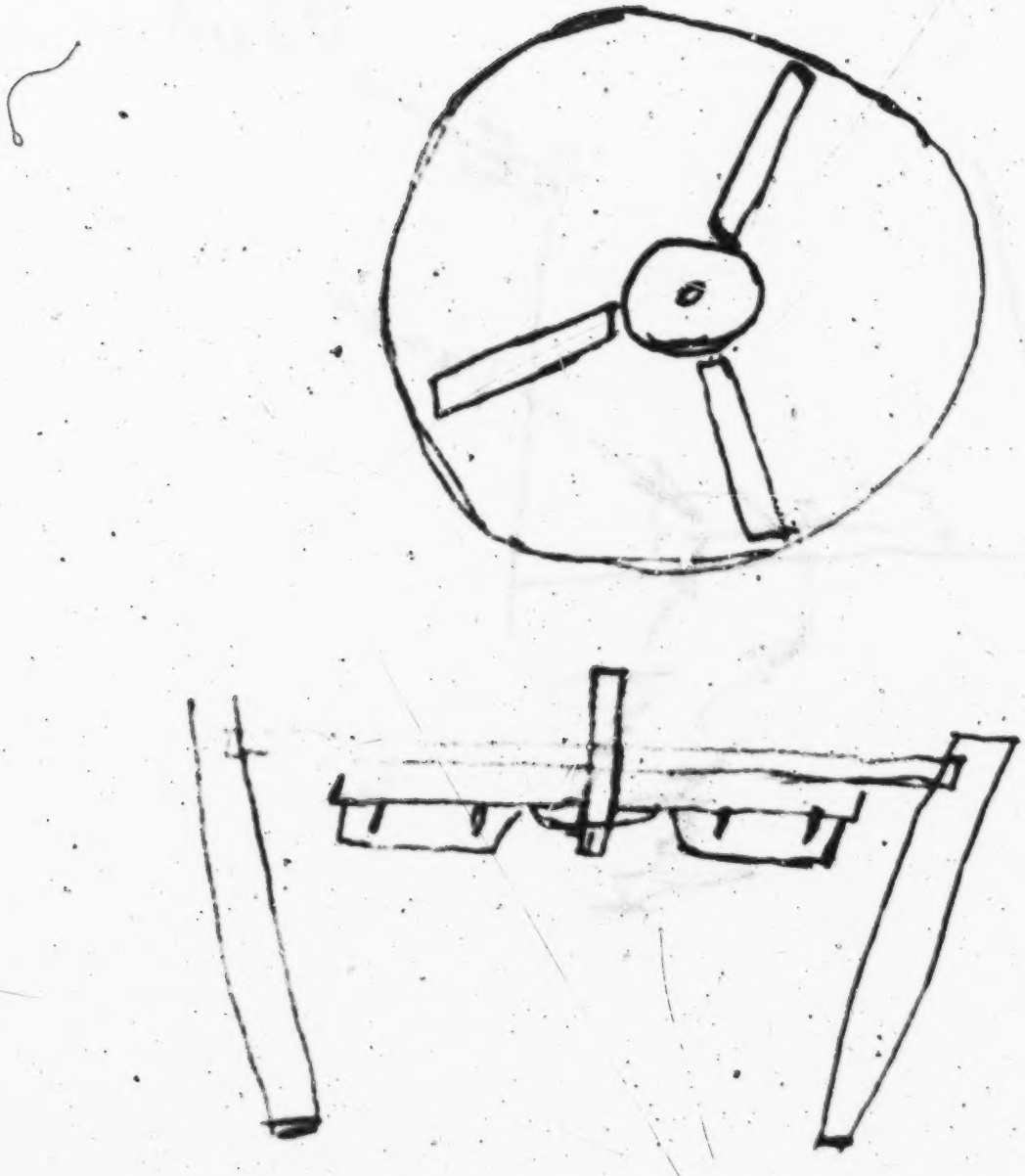

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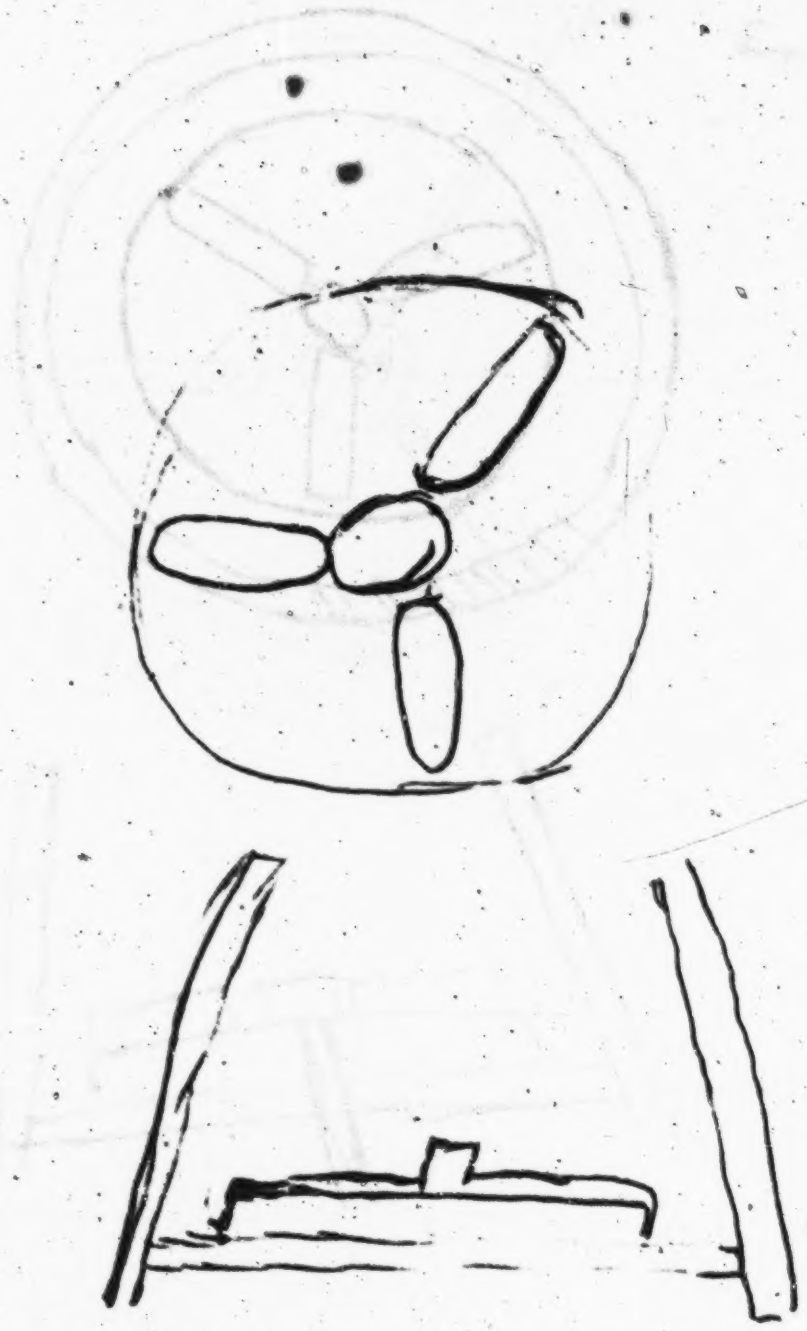
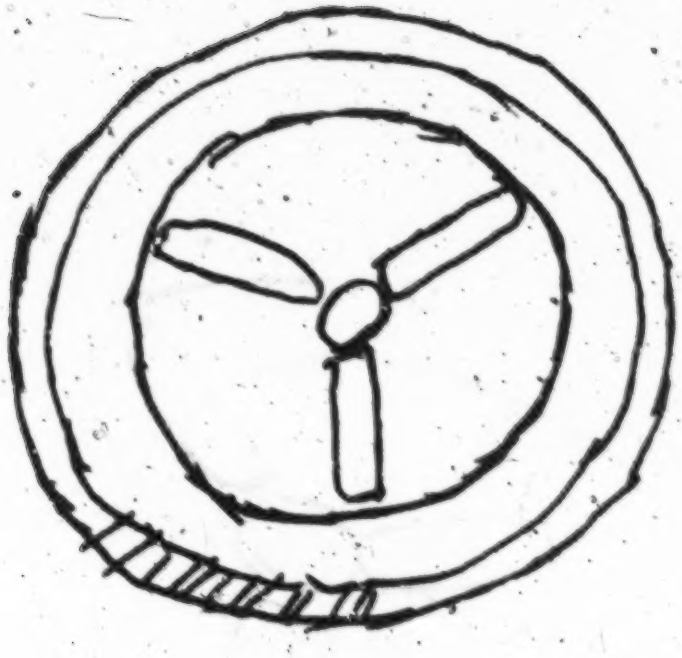
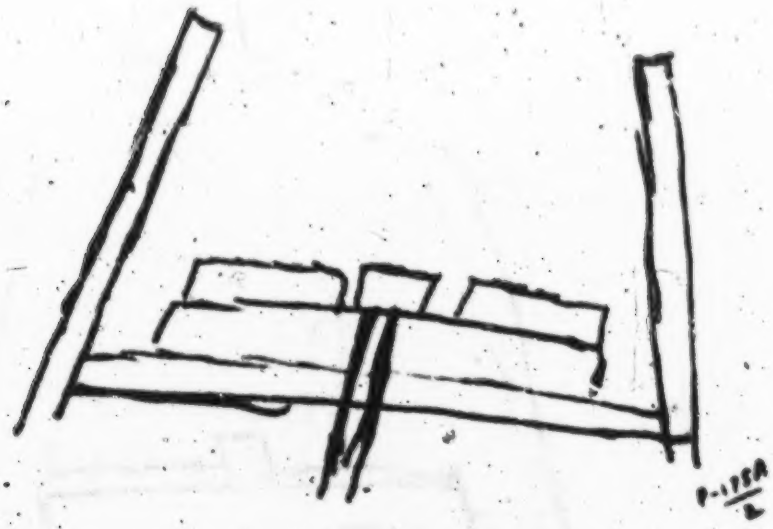
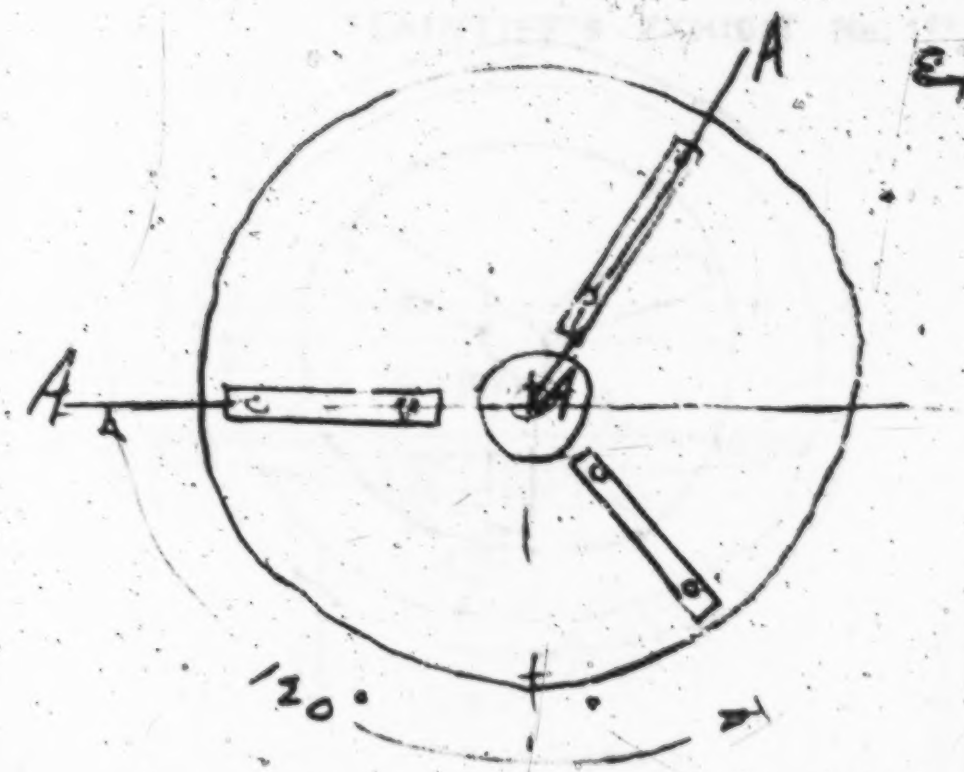






PLAINTIFF'S EXHIBIT No. 176

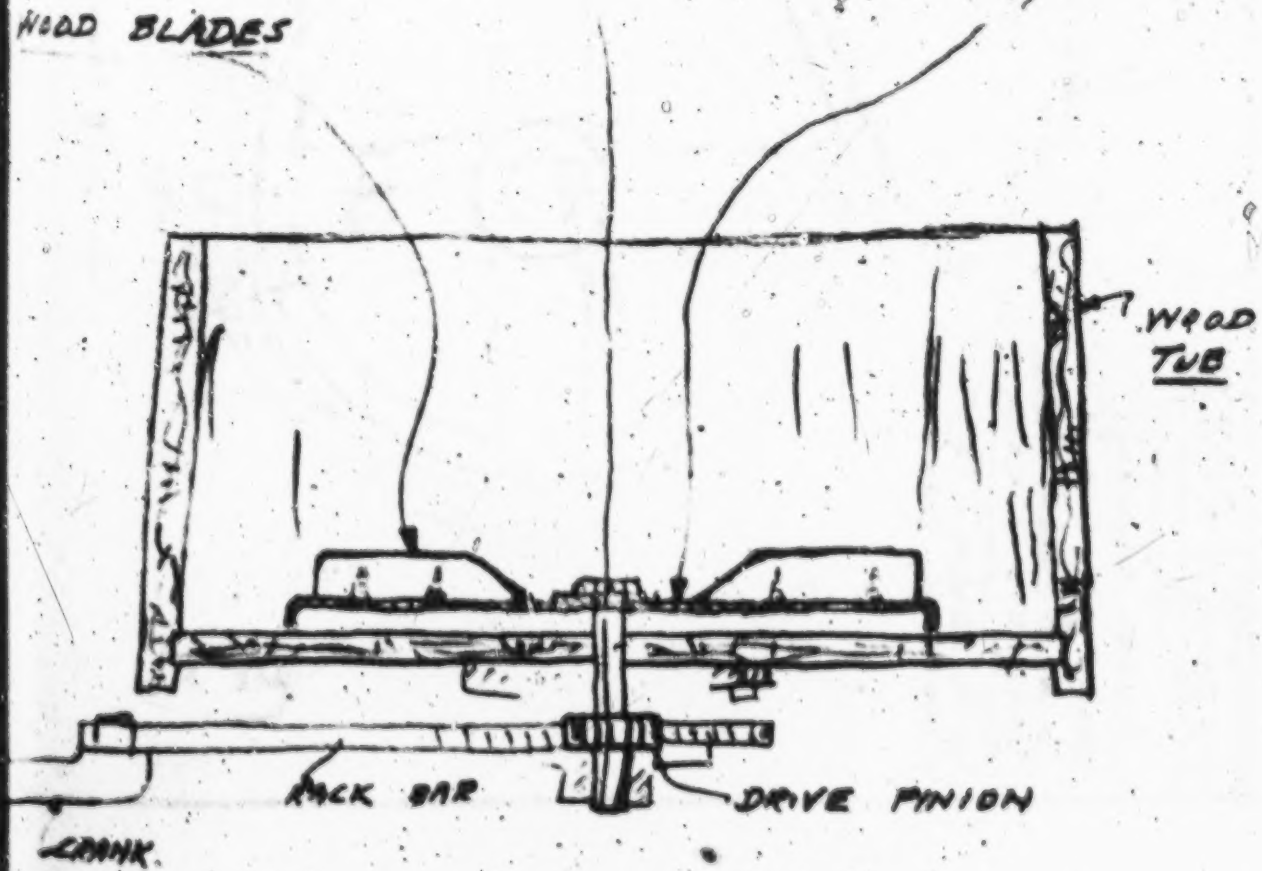
814



Ex. 17.

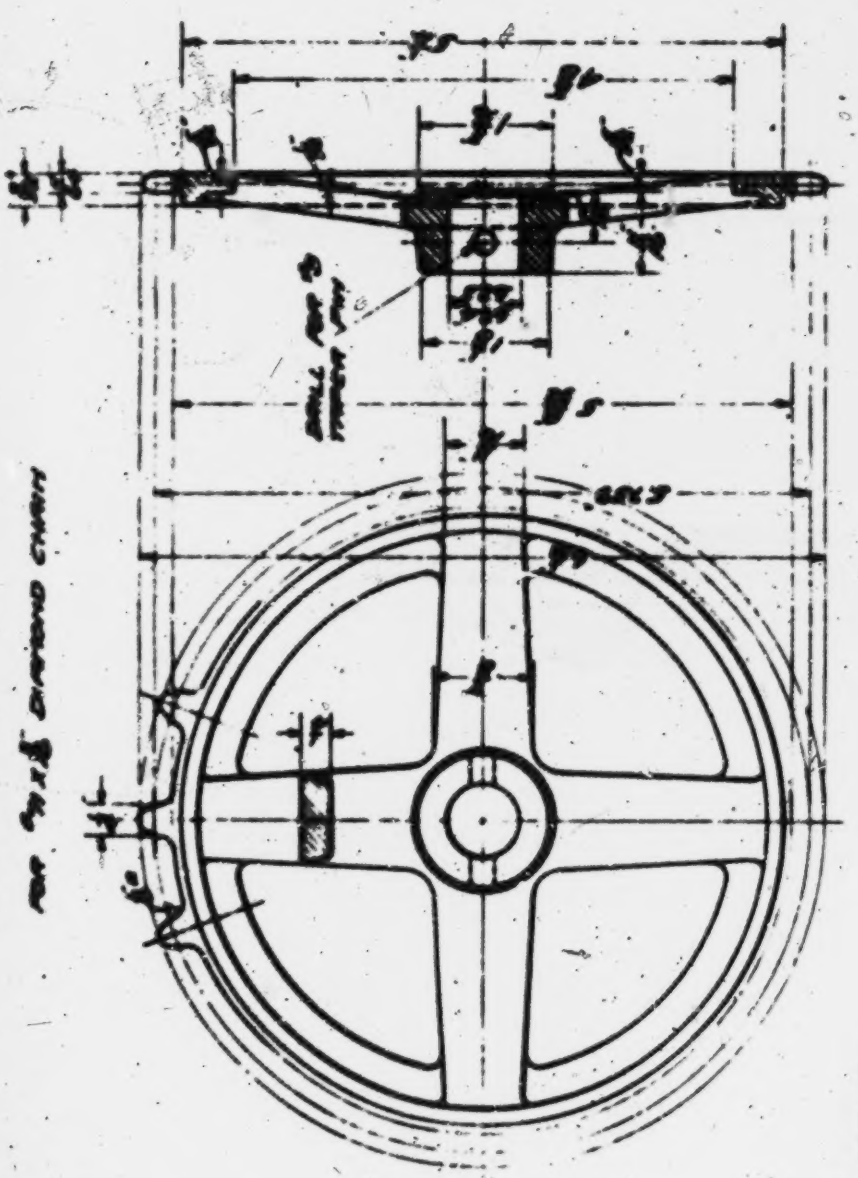
SHEET STEEL DISC

WOOD BLADES



CROSS SECTION A-A-A

PLAINTIFF'S EXHIBIT No. 177



4 144

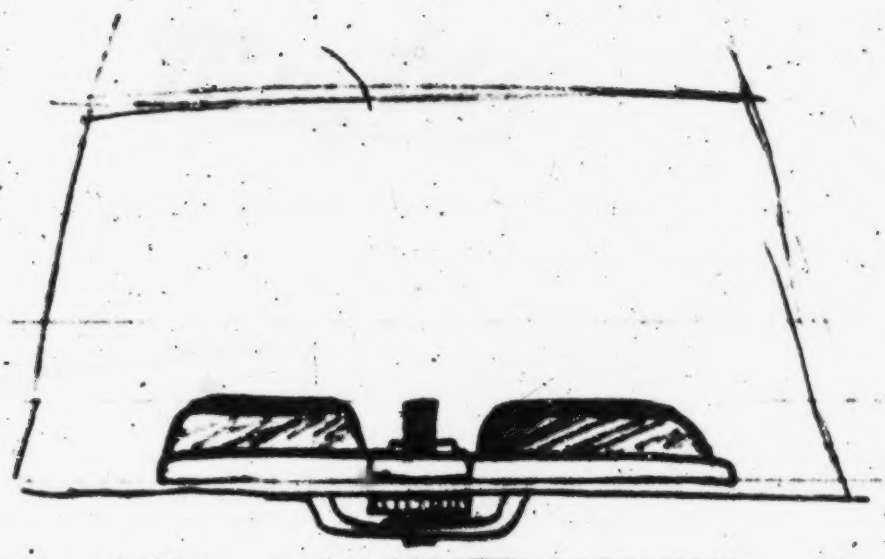
1 REQ'D CAST IRON
SCALE FULL SIZE

- SPROCKET DATA -
NO OF TEETH = 18
PITCH = 1"
PITCH DIA. = 5.729"

THE WAYNE COMPANY
DETAILS OF THE
CYLINDER MACHINE
- CUTTING -

5022

PLAINTIFF'S EXHIBIT No. 183



PLAINTIFF'S EXHIBIT No. 184 817

Maytag

INTER-FACTORY COMMUNICATION

October 16th 1921

F.L. Maytag
Chairman of the Board.

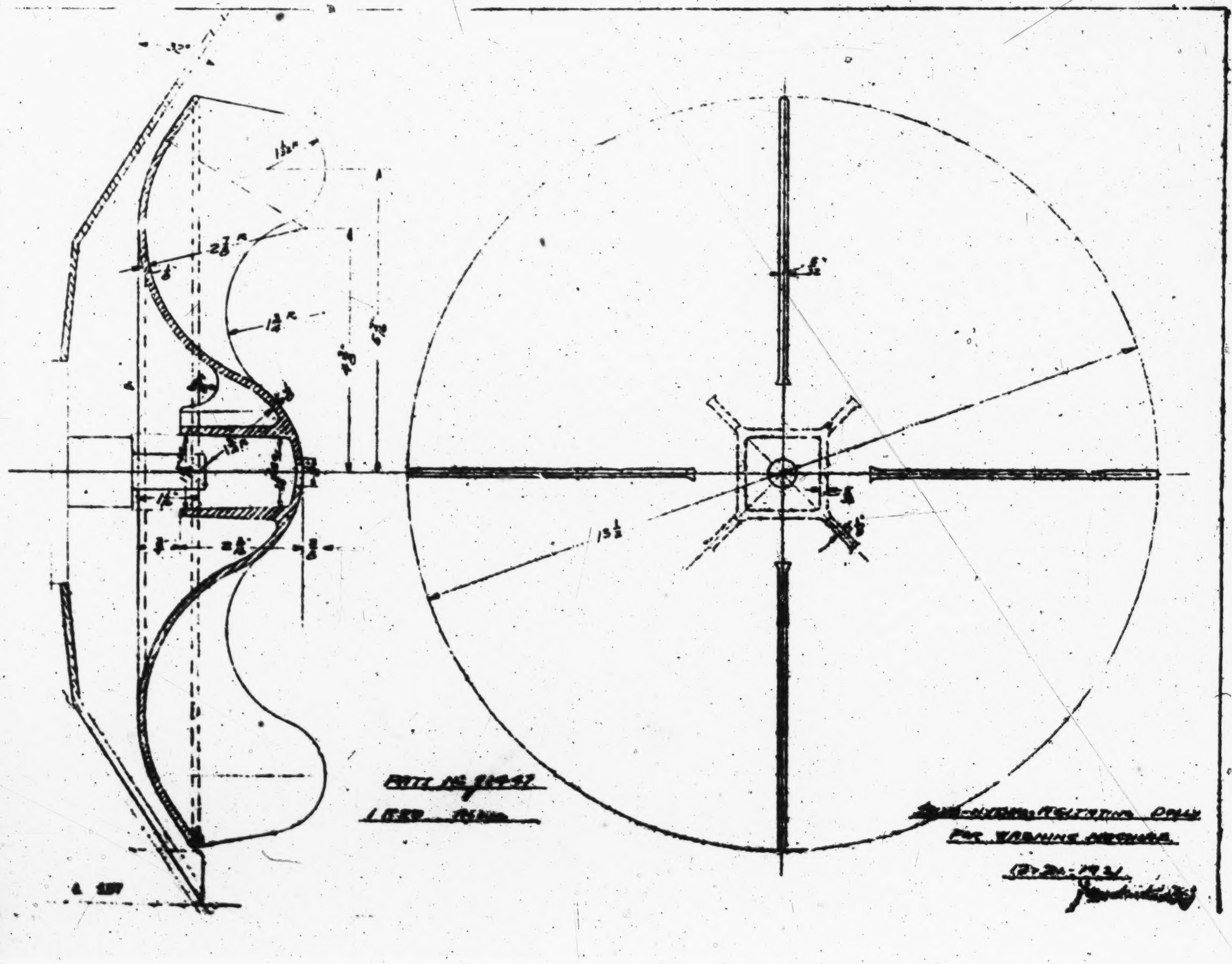
I want you to know that as soon as you return you can see the new washer in operation at Mrs Ellingsworth's. As I mentioned to you I have put the agitator in the bottom of a model 70 aluminum tub and it gives much better water action than in the flat bottom wood tub. I also added another blade.

I have heard nothing yet from Mr. Blanks in regard to the Cushman engine on the bug machine and thought maybe you might care to write him if you think he has returned to Texas yet.

Howard E. Snyder

818.

PLAINTIFF'S EXHIBIT No. 128



819

A. J. DREMEL.

WASHING MACHINE.

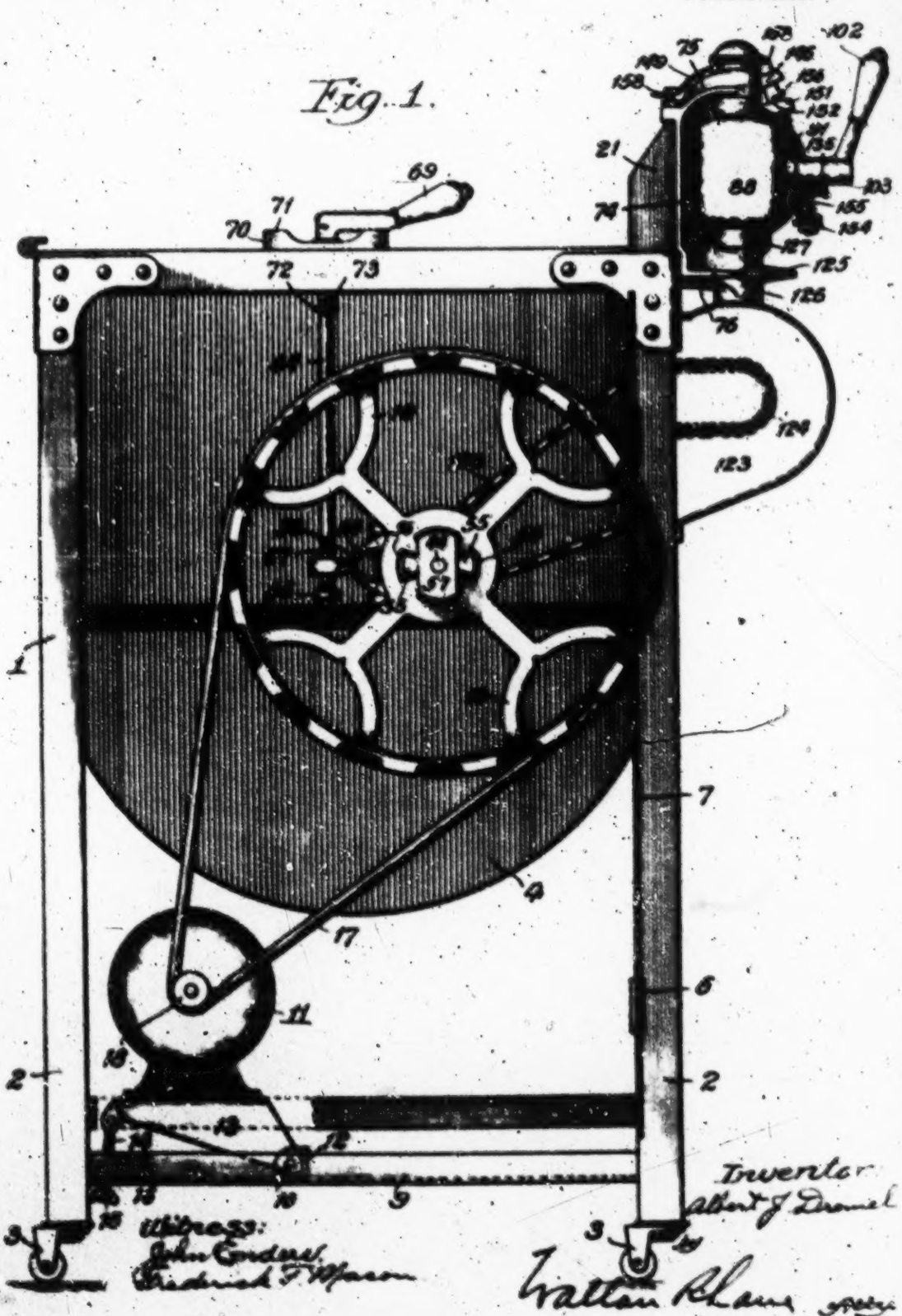
APPLICATION FILED FEB. 11, 1918.

1,417,306.

Patented May 23, 1922.

7 SHEETS—SHEET 1.

Fig. 1.



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A. J. DREMEL.

WASHING MACHINE.

APPLICATION FILED FEB. 11, 1918.

1,417,306. Patented May 23, 1922.

7 SHEETS—SHEET 2.

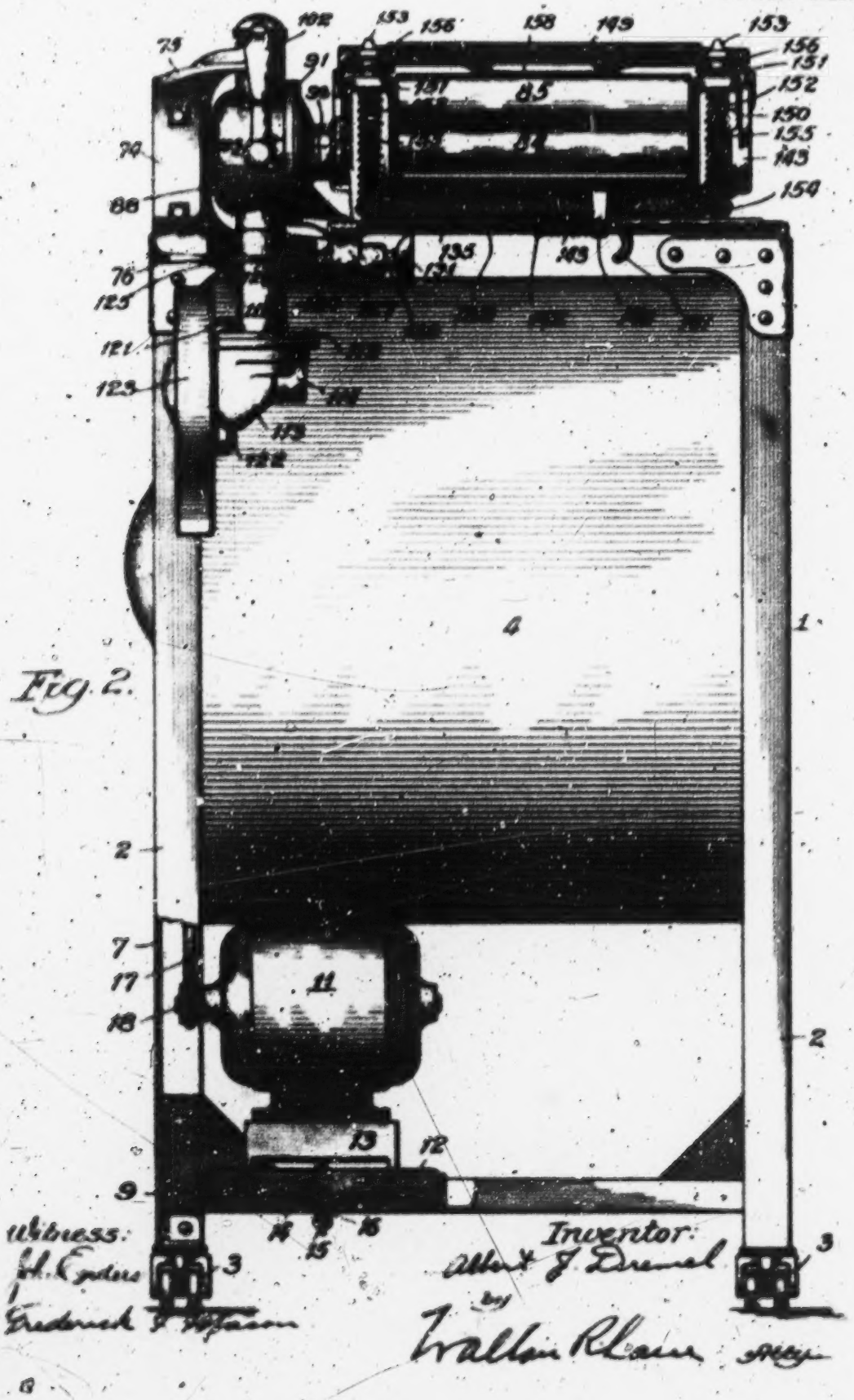

Fig. 2.

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WASHING MACHINE.

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7 SHEETS—SHEET 3.

Fig. 3.

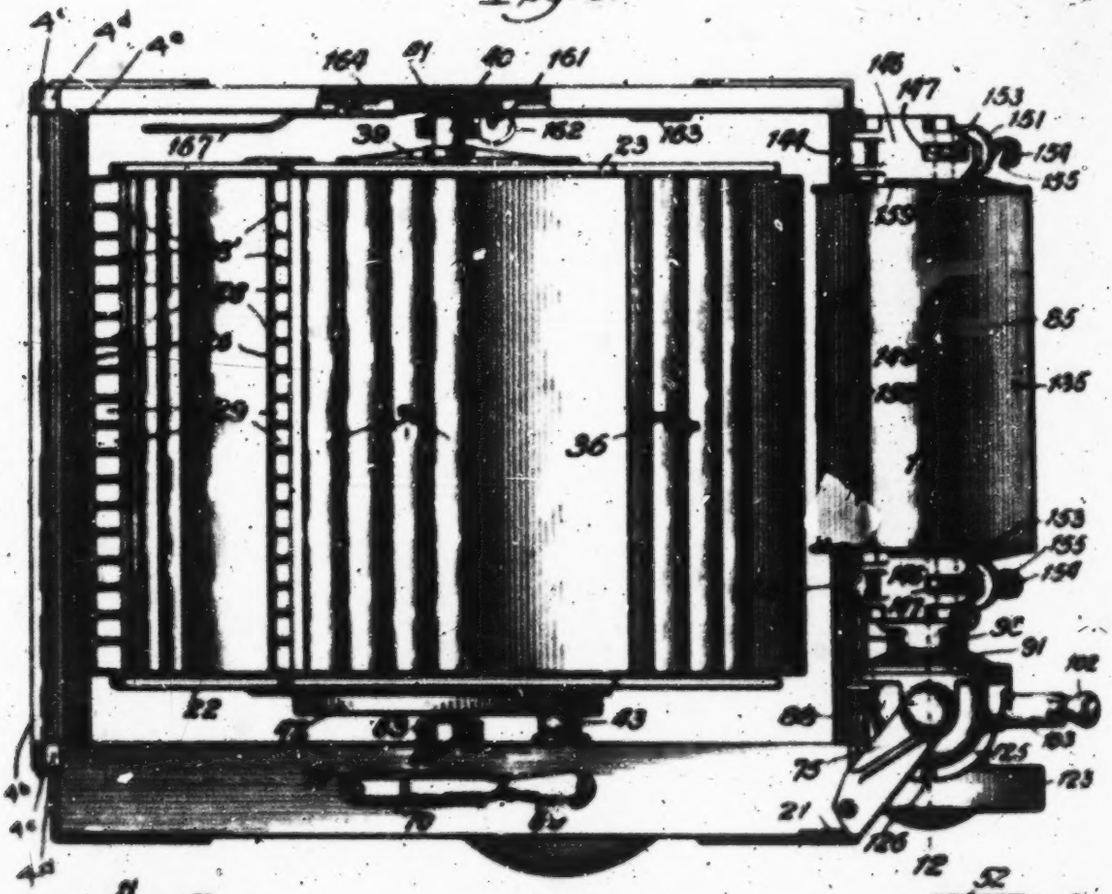

Fig. 10.

Fig. 9.

Fig. 8.

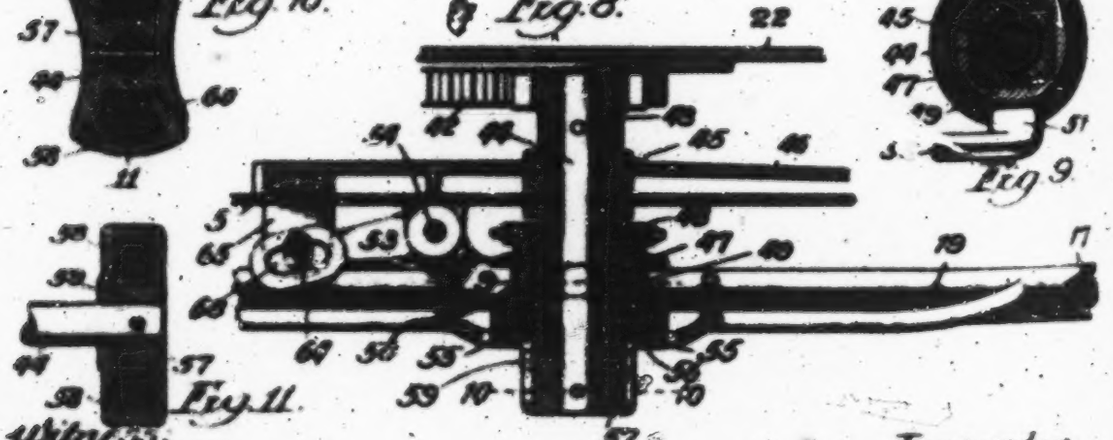

Fig. 11.

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WASHING MACHINE.

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1,417,306. Patented May 23, 1922.

7 SHEETS—SHEET 4.

Fig. 4.

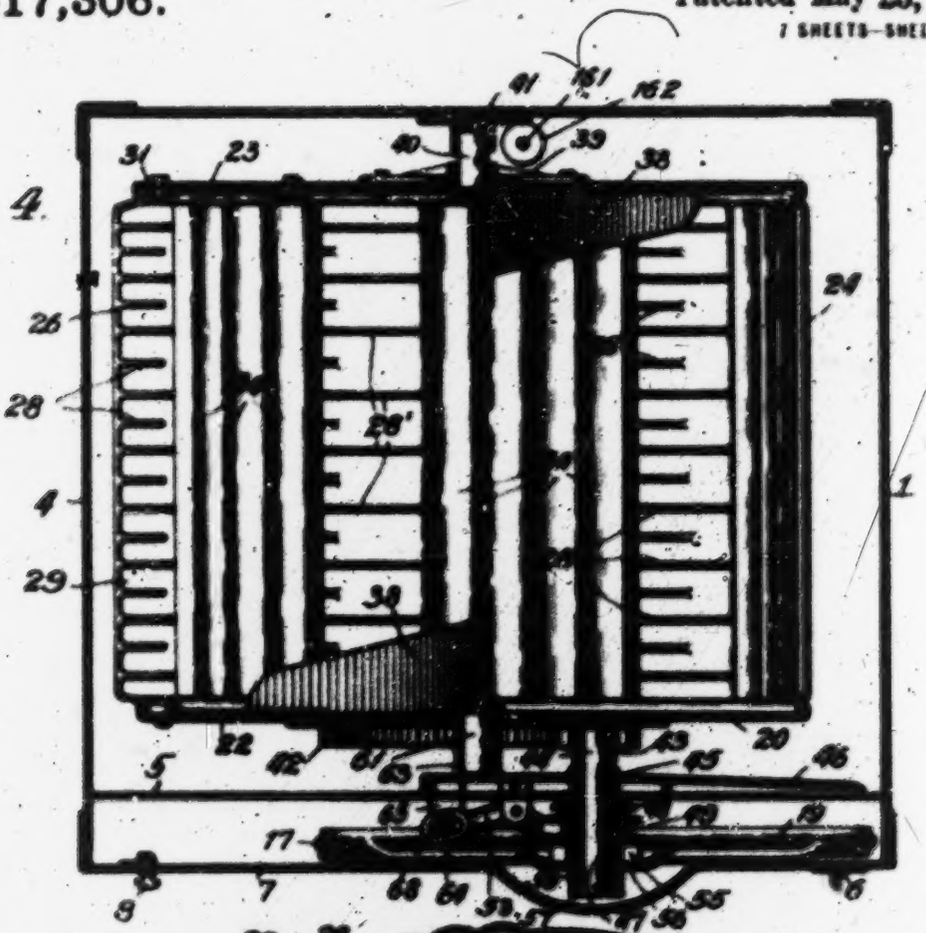
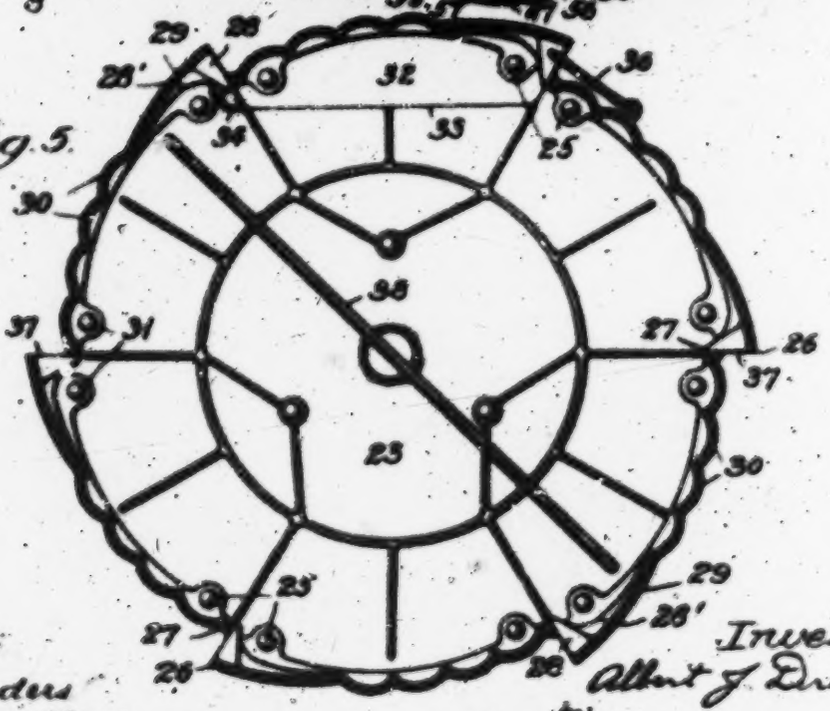


Fig. 5.



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1,417,306.

Patented May 23, 1922.

7 SHEETS—SHEET 3.

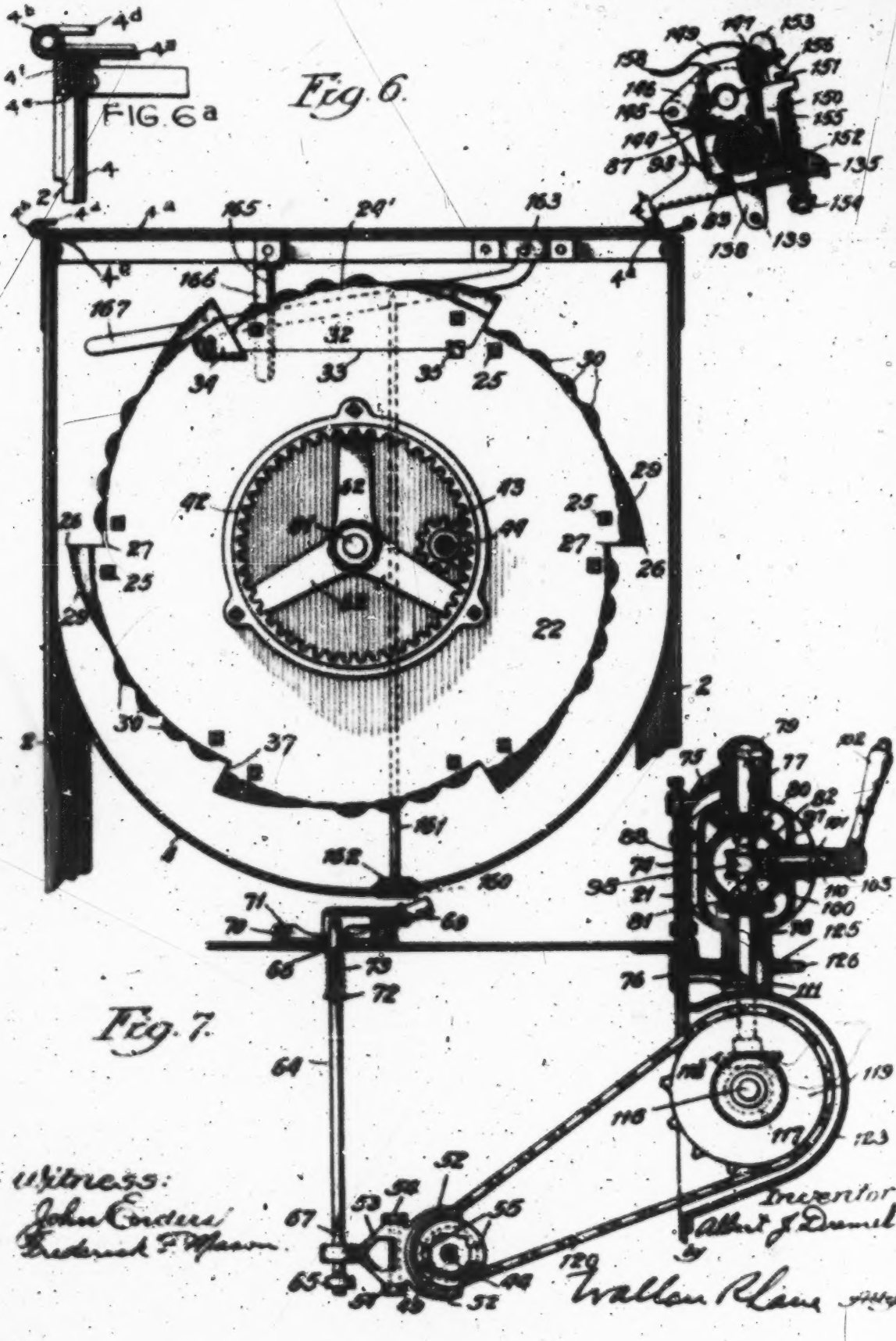

Fig. 6.

FIG. 6a

Fig. 7.

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APPLICATION FILED FEB. 11, 1918.

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Patented May 23, 1922.

7 SHEETS—SHEET 6.

Fig. 12.

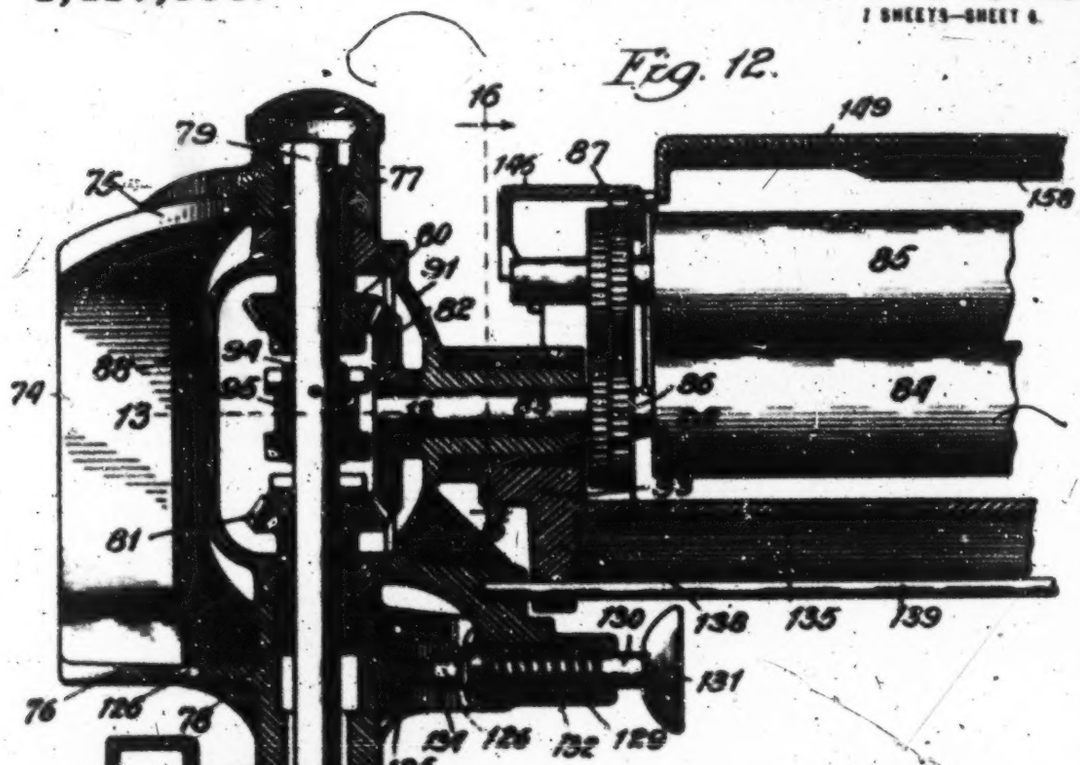


Fig. 13.

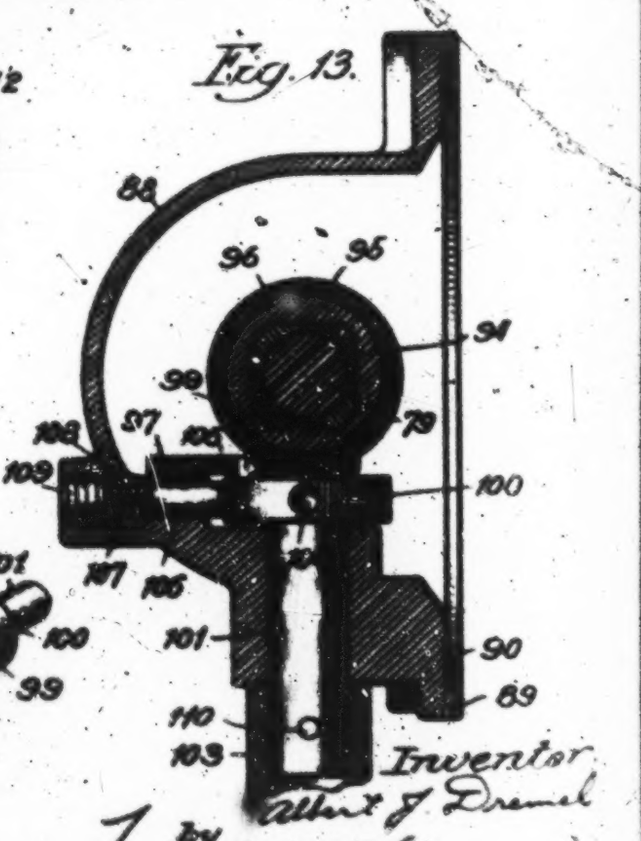
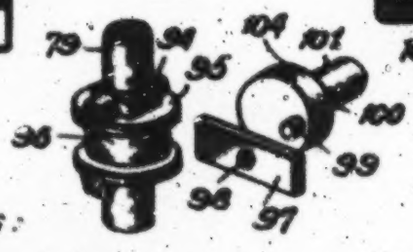


Fig. 14.



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WASHING MACHINE.

APPLICATION FILED FEB. 11, 1918.

1,417,306.

Patented May 23, 1922.

2 SHEETS—SHEET 1.

Fig. 15.

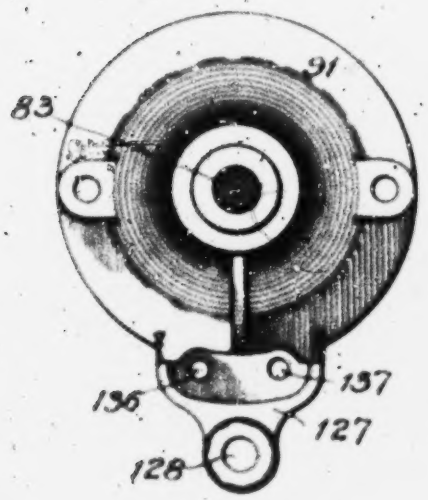


Fig. 16.

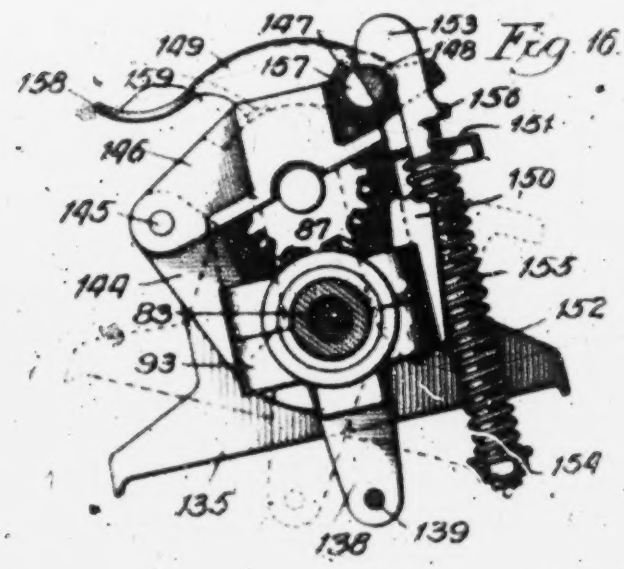


Fig. 17.

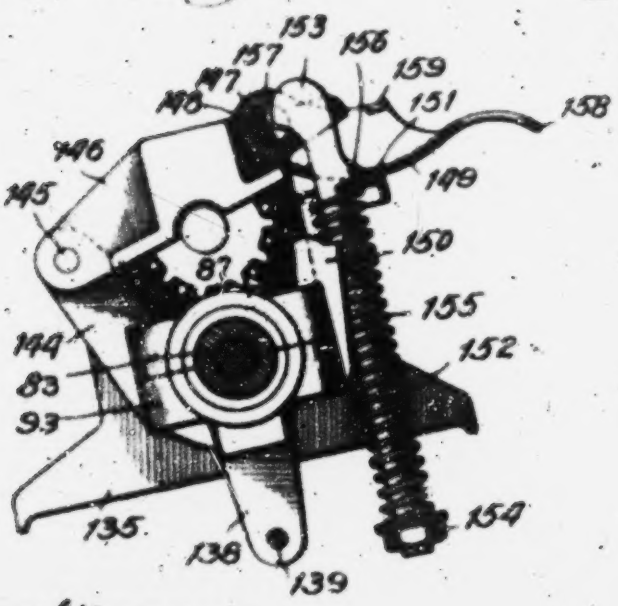
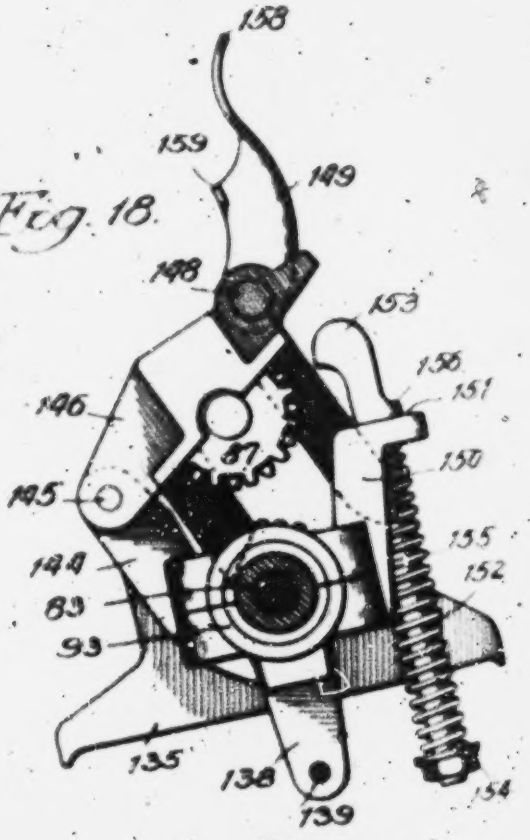


Fig. 18.



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UNITED STATES PATENT OFFICE.

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WASHING MACHINE.

1,417,306. Specification of Letters Patent. Patented May 23, 1922.

Application filed February 11, 1918. Serial No. 216,436.

To all whom it may concern:

Be it known that I, ALBERT J. DREMEL, a citizen of the United States, residing at Newton, in the county of Jasper and State of Iowa, have invented certain new and useful Improvements in Washing Machines, of which the following is a specification.

This invention relates to washing machines, and more particularly to those of the cylinder type with a wringer attached.

Among the objects of my invention is to produce a washing machine possessing the maximum of efficiency, silence, safety, convenience, simplicity, durability, and ease of operation, and having its parts so located that they can be quickly manipulated with no danger of catching the clothing or endangering the hands of the operator, or of soiling or tearing the clothes that are being washed; further to provide a novel washing cylinder in which the clothes are not only effectively rubbed but are subjected to a rapid flowing of the water thereagainst, whereby they may be more thoroughly cleansed; further to provide a wringer having an instant release in which the clothes can be quickly released in case any article becomes entwined around the rollers or clogged therebetween; further to provide a wringer which by a simple movement can be tilted to accommodate wringing in either direction, and which tilting movement will automatically carry the drain board into proper position; further to provide an adjustment to permit the wringer to be horizontally swung into any one of a plurality of adjusted positions; further to provide a novel form of cabinet for housing the cylinder and its mechanism, and arranged to automatically wipe all water from the under side of the cover in withdrawing the same; further to eliminate all wood in the construction; further to form the cylinder of aluminum whereby it will be substantially non-corrosive and of maximum sanitary value; further to reduce to the minimum the number of controlling levers; further to provide a machine which will not only effectively wash heavy clothing but will also handle the most delicate laces or the finest white clothes with even less danger of tearing and soiling than when washing by hand; further to provide means for preventing the clothes from becoming bunched together in the washing cylinder; further to eliminate excessive shock when throwing the cylinder operating mechanism into operation; further to provide a novel means for draining the tank; and such further objects, advantages and capabilities as will later appear.

My invention further resides in the combination, construction and arrangement of parts illustrated in the accompanying drawings, and while I have shown therein a preferred embodiment, I desire it to be understood that the same is susceptible of modification and change without departing from the spirit of my invention.

In the drawings:

Fig. 1 is an end elevation of a washing machine embodying my invention, and having the swinging door standing open at an angle of ninety degrees in order to show the driving mechanism;

Fig. 2 is a side elevation at right angles to that shown in Fig. 1.

Fig. 3 is a top plan view with the tank cover in its open position.

Fig. 4 is a horizontal transverse sectional view taken on a plane passing through the center of the cylinder.

Fig. 5 is a vertical sectional view through the cylinder.

Fig. 6 is a vertical sectional view showing the end of the cylinder and the gearing for operating the same.

Fig. 6ª is a detail view of the construction shown in the upper left-hand corner of Fig. 6.

Fig. 7 is a fragmentary vertical section through the wringer gearing and mechanism for operating the cylinder.

Fig. 8 is a fragmentary horizontal section taken through the cylinder operating mechanism.

Fig. 9 is a vertical section taken on the line 9—9 of Fig. 8.

Fig. 10 is a vertical section taken on the line 10—10 of Fig. 8.

Fig. 11 is a fragmentary vertical section taken on the line 11—11 of Fig. 10.

Fig. 12 is a vertical section through the wringer gearing taken on the line 12—12 of Fig. 3.

Fig. 13 is a horizontal section through the wringer operating clutch mechanism, taken on the line 13—13 of Fig. 12.

Fig. 14 is a view showing the wringer

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clutch, the sliding plate and the operating disc in position ready to be assembled.

Fig. 15 is a side elevation of the wringer gearing cover.

Fig. 16 is a vertical section taken on the line 16—16 of Fig. 12 and looking in the direction of the arrows.

Fig. 17 is a view similar to Fig. 16, but showing the top guard plate swung forward just prior to raising the top roll and in position to unlock the same.

Fig. 18 is a view similar to Fig. 17, but showing the top roll in elevated position.

Referring to the drawings, my improved washing machine comprises the upright frame or stand 1, having the legs 2, upon the bottom of which are suitably secured caster rollers 3. This frame is constructed entirely of metal and has secured therein the tank 4, extending vertically in which tank and adjacent one end is the partition 5. Suitably hinged at 6, as shown in Figs. 1 and 4, is the swinging door 7, this door being shown standing open at ninety degrees in Fig. 1 and closed in Fig. 4. Suitable means 8 may be provided for securing the door in closed position. Extending between the legs 2 and near the bottom thereof are the cross beams 9 upon which is suitably pivoted at 10, upon the cross pieces 12, the motor 11. The base 13 of the motor has pivotally connected at its forward end the downwardly extending rod 14, which projects through one of the cross members and is provided on its lower end with the wing nut 15, between which wing nut and the cross member is a coil spring 16 to resiliently hold the motor against excessive upward movement. This arrangement enables the weight of the motor and its parts, in conjunction with the tension of the spring 16, to act as a tightening means for the belt 17, which runs over the motor pulley 18, and the large drive wheel 19, which drive wheel is so turn suitably connected for rotating the washing cylinder 20 journaled within the tank 4. Located upon the upper corner of the tank frame is the bracket 21, upon which is mounted the wringer to be hereinafter described.

The machine is provided with a cover, 4^a, having at the forward and rear edges thereof rolls, 4^b, the forward one of which is provided with a rod, 4^c, the extending ends of which engage hooks, 4^d, at opposite sides of the machine, so that when the cover is shoved backwardly and allowed to hang at the back of the machine, these extending ends will support said cover from the hooks, 4^d. Overlapping the top of the machine and extending downwardly at the back side thereof is a wiper strip, 4^e, which is clamped between the top of the machine and the band, 4^f, so that the same may be held in position to wipe the under side of the cover 4^a, as the cover is shoved backwardly. This wipes all the surplus water from the under side of the cover and prevents the same from dripping on the floor.

The cylinder 20 comprises the spaced end plates 22 and 23, the configuration of which is best seen in Fig. 6. Secured between the marginal edges of these end plates are the circumferential washing plates 24, of which there are six in number. These plates, as will be seen in Fig. 6, are secured to the end plates by means of suitable bolts 25 or similar fastening means, and each has its forward edge 26 radially spaced from the rear edge 27 of the next preceding plate. These plates are provided at their forward edges 26 with a series of inwardly extending teeth 28, as best seen in Fig. 4, and which teeth extend perpendicularly from the body of the plate across the space just described. This forward portion of the plates 24 is of outwardly extended scoop formation 29, as clearly seen in Figs. 4 and 5. The result of this scoop formation is that upon rotation of the cylinder within the tank, the water will be forced through these spaces and between the teeth 28 into the interior of the cylinder. The plates 24 are also corrugated along their rear portions at right angles to their direction of travel, as shown at 30 (see Figs. 3, 4, 5 and 6.) Within the scoop portions are the rearwardly extending ribs 2[illegible] as best seen in Figs. 4 and 5. The water as it enters between the teeth 28 and through the scoop portion of the plates will be forced against the clothes, which, as the cylinder rotates, will be rubbed against the corrugations 30. These corrugations have a tendency to carry the clothes upwardly for a short distance after which they will slide downwardly thereover thus producing a wash board effect. At the ends of each of the plates 24 are formed the lugs 31, by means of which these plates are secured to the marginal portions of the plates 22 and 23 by the bolts 25 referred to above. One of the plates is so formed and arranged that it may be easily and quickly removed or replaced in order to serve as a door for the cylinder. This specially formed plate is best seen in Fig. 6, at 24′, and has formed upon each end thereof the downwardly extending flanges 32, which are adapted to fit into the cutaway portions 33 of the end plates. The flanges 32 are shaped at their rear corners to fit snugly into the outwardly pressed sockets 34 formed in the end plates, while at their forward corners they are provided with the downwardly extending lugs 35 adapted to fit over the outside of the edge of the cutaway portion 33 to prevent any lateral shifting of these plates. The rear corners of the plate 24′ by fitting into the sockets 34 hold the rear edge of this plate securely in position, while the front edge is detachably secured in position by means of a suitable hook

36, or other similar device, and which hook when it is desired to remove this cover plate can be quickly unlatched to permit the removal of the plate. An inspection of Fig. 6 will show that the end plates 22 and 23 do not have their marginal portions in the form of a true circle, but at six equally spaced positions around the circumference, the curvature is such as to fall inside of the margin of a major circle, so as to provide offsets 37, which serve to give the proper inclination to the plates 24, and also to increase the space between the forward edge of these plates and the rear edge of the next preceding plate.

Each of the end plates has formed integrally therewith and on their inside face, a diametrically extending rib 38, and in assembling these end plates they are so positioned that these ribs will fall in planes at right angles to each other, the purpose for which is to break up the rolling of the clothes during the rotation of the cylinder by continually throwing them up sideways, and thus preventing them from becoming bunched or too tightly packed together. By placing these ribs at right angles to each other, this breaking up of the bunching of the clothes is accomplished to a far greater degree than would be possible were the ribs placed parallel to each other.

Secured upon one end of the cylinder is the spider 39, within which is fixed the journal 40 for rotation in the bearing 41, which bearing is open at its upper side to permit the removal of the journal in an upwardly direction therefrom. Secured upon the opposite end of the cylinder and to the end plate 22 is the annular gear 42, meshing with which is the pinion 43 mounted upon the shaft 44, journaled in the sleeve 45 mounted in the bearing bracket 46, which bracket is suitably secured to the partition 3. Mounted upon the sleeve 45 and adjacent the outer end thereof is the sleeve 47, which is formed integrally with the drive wheel 19 to rotate therewith. This sleeve 47 has fixed upon its inner end the sprocket wheel 48, and also has slidably mounted thereon the sliding clutch 49; the cross section of the sleeve 47 and of the opening in the clutch 49 being substantially square whereby to cause these parts to rotate together, and yet permit free longitudinal movement therebetween. The clutch 49 is provided around its circumference with the groove 50, in which groove and at diametrically opposite points, slidably fit the projections 51 of the arms 52 carried by the lever 53, which lever is pivoted at 54. The clutch 49 is formed on its outer end with suitable clutch teeth or projections 55, which are adapted to slide through openings 56 in the hub of the drive wheel 19. Keyed to the outer end of the shaft 44 is the recessed plate 57, which is shown in cross section in Figs. 10 and 11, and in the recesses of which are mounted the resilient pads 58. Just back of this recessed plate 57 and loosely mounted upon the shaft 44 is the flanged plate 59, the flanges 60 of which are adapted to also enter the recesses of the recess plate, so that the resilient pads 58 will lie between one of these flanges and the opposite wall of the recessed plate. Upon suitable movement of the lever 53, the clutch 49 will be caused to slide outwardly through the opening 56 in the drive wheel and the clutch tooth 55 caused to come into engagement with each of the concave sides of the flanged plate 59, and when this clutch 49 is rotated by the drive wheel 19, it will when it comes into engagement, also cause the plate 59 to rotate carrying with it the plate 57. As will be seen from an inspection of Fig. 10, when plate 59 is caused to rotate, the flange 60 will at once compress the resilient pad 58 between this flange and the opposite wall of the recess in the plate 57, thus effectively absorbing the shock that would be otherwise placed upon these parts by suddenly throwing the cylinder into rotation, which rotation, as will be seen by Fig. 8, is transmitted from the plate 57 through the shaft 44 and pinion 43 to the annular gear 42 secured upon the end of the cylinder. It may here be noted that the cylinder is rotatably mounted at its driving end by means of the stub shaft 61 secured in the hub of the arms 62, which arms are formed integrally with the annular gear 42. The stub shaft 61 at its outer end is rotatably mounted in the bearing 63 formed integrally with the gearing bracket 46, which bearing is also open towards the upper side as shown in Fig. 3 to permit this stub shaft to be removed upwardly therefrom in a manner similar to that of stub shaft 40 at the opposite end of the cylinder, thus permitting the cylinder to be vertically removed from the tank.

As a means for operating the lever 53 to throw the clutch into or out of engagement, I have provided the vertical shaft 64 journaled at its lower end in the bracket 65, and at its upper end in the bearing 66 formed in the upper part of the frame. At a point slightly above the bearing 65, the rod 64 is formed with the crank 67, which as shown engages the slot 68 in the free end of the lever 53. Pin-connected to the upper end of the shaft 64 is the handle 69, and underneath this handle for engagement therewith is located upon the top of the frame, the bearing plate 70, the opposite ends of which are provided with the raised portions 71, upon one of which the handle rests when in position to cause the cylinder to rotate, and upon the other of which it rests when the mechanism for rotating the cylinder

is thrown out of engagement. Encircling the upper shaft 64 and secured between the collar 72 and the under side of the frame is the coil spring 73, the function of which is to exert a downward thrust on the shaft 64 to thus hold the handle 69 suitably in the desired position. It will be apparent that upon rotation of the handle 69, the lever 53 will be correspondingly moved and the clutch 49 operated to cause the pinion 43 to drive the annular gear 42 or not as desired.

Suitably bolted to the bracket 21 is a second bracket 74 comprising the upper arm 75 and the lower arm 76, each of which arms is provided with suitable bearings for the sleeves 77 and 78 respectively, and in which sleeves are in turn journaled the vertical shaft 79, loosely mounted upon which are the bevelled gears 80 and 81, which in turn mesh with the bevelled gear 82 fixed upon the shaft 83, which shaft carries the lower roller 84 of the wringer. The roller 84 is rotatably geared with the upper roll 85 through the medium of the gears 86 and 87. Rotatably mounted upon the sleeves 77 and 78 and between the arms 75 and 76 is the gear housing 88, which as seen in Fig. 13 is provided with the flat front face 89, which is recessed at 90, and to which face fits the cover plate 91, which has integrally formed therewith the outwardly extending sleeve 92, upon which is journaled the bearing 93 of the main portion of the wringer frame whereby the wringer is rotatably mounted upon the sleeve 92, as best shown in Fig. 12.

The means for reversing the direction of rotation of the wringer rolls comprise the sleeve 94 (see Fig. 13) which is keyed to the shaft 79 and the exterior surface of which is substantially square in cross section. Slidably mounted upon this sleeve 94 is the clutch 95, which is provided with the circumferential groove 96, within which fits the plate 97, which is provided with the opening 98, within which opening is adapted to fit the pin 99 which is eccentrically carried by the disc 100. This disc is fixed upon the end of the shaft 101 to rotate therewith when this shaft is rotated by a suitable manipulation of the handle 102 mounted upon the sleeve 103. From this construction, it will be seen that by throwing the handle 102 to one side or the other, the shaft 101 will be correspondingly rotated, which in turn rotates the disc 100, causing the plate 97 to be elevated or lowered, thus elevating or lowering the sliding clutch 95, the ends of which are suitably formed to engage corresponding clutch surfaces in the gears 80 and 81. These gears being located on diametrically opposite sides of the gear 82 will, as is obvious, cause the same to rotate in one direction or the other, in accordance with which of the gears 80 or 81 is being driven by the clutch 95.

In order to lock the clutch 95 in elevated or lowered position, I have provided the disc 100 with a plurality of openings 104, within any one of which may engage the tapered end 105 of the pin 106, which pin is resiliently held in engagement in said openings by the coil spring 107 mounted in the opening 108 and held between the end of the pin 106 and the inner surface of the plug 109. This as will be apparent is sufficient to hold these parts against any ordinary pressure or jar and yet will permit these parts to be moved upon sufficient pressure being exerted upon the handle 102. It will be noted that the shaft 101 is fixed to the sleeve 103 by means of the pin 110.

The lower arm 76 of the bracket 74 is extended downwardly to form the leg 111 which leg is suitably bored and in which is journaled the lower end of the shaft 79. This leg 111 is provided at its end with the flange 112, to which flange is suitably bolted the integral gear housing 113, which housing is provided at its opposite sides with the bearings 114 and 115, within which is journaled the shaft 116. Upon the shaft 116 is fixed the bevelled gear 117, which in turn meshes with the bevelled gear 118 fixed upon the lower end of the shaft 79. The shaft 116 projects a substantial distance beyond the end of the bearing 115 and has fixed thereupon the sprocket wheel 119, which sprocket wheel is in alignment with the sprocket wheel 48 described above, and over which two sprocket wheels runs the sprocket chain 120, by means of which rotation is transmitted from the drive shaft 44 to the shaft 116, and in turn to the wringer rolls 84 and 85. Suitably placed over the sprocket wheel 119 and bolted to the flange 112 by bolts 121 and to the integral housing 113 by bolts 122 is the housing 123, which is provided in its inner side with the slot 124, whereby the same may be slid in position over the bearing 115 preparatory to being bolted in place.

From the construction described above, it will be seen that the wringer is mounted for horizontal rotation upon the shaft 79 through the medium of the sleeves 77 and 78, and in order to permit the wringer to be locked in any one of a plurality of horizontal positions, the lower arm 76 of the bracket 74 is provided with a flange 125, which flange is in turn provided around its circumference with a plurality of notches 126. Extending downwardly from the cover plate 91 of the gear housing and as best seen in Fig. 15, is the projection 127, which projection is provided with the opening 128 in line with which is the cylindrical bore 129. Slidably mounted within the opening 128 is the stem 130, which carries upon its

...ter end the handle 131. Encircling this ...em and located within the cylindrical bore ...9 is the coil spring 132, which spring is ...tably compressed between the closed end ...f the cylindrical bore and the collar 133 ...ured upon the stem 130, constantly im...ling this stem inwardly, whereby its ta...ed end 134 may be brought into engage...ent with any one of the notches 126 desired, ...s locking the wringer in any one of a plu...ity of horizontal positions, whereby the ...e may be made to wring clothes either di...ctly from the tank, or from a separate rins...g tub, into a separate basket, or in any other ...sition in which it is desired to operate the ...e. As will be obvious, the stem 130 can ... pulled outwardly by pressure exerted ...n the handle 131, whereby to release the ...d 134 from the notches 126 preparatory to ...ating the wringer into a different posi...n.

As stated above, the wringer is mounted ... vertical rotation upon the sleeve 92, ...reby the wringer frame and the drain ...rd 135, which is secured thereto at the ...tom, may be quickly and suitably tilted ...rds either side, whereby to accommo...te wringing in either direction. In order ... lock the wringer in the desired one of ...se tilted positions, I have provided a suit...le locking means which I will now describe. ...shown in Fig. 15, the projection 127 of the ...er plate 91 is provided with the apertures ...6 and 137, and the downwardly extending ...g 138 of the wringer frame is also provided ...h an aperture which can be brought into ...istry with either one of the apertures 136 ... 137 upon suitable rotation of the wringer ...n the sleeve 92. Extending through the ...erture in the leg 138 is the rod 139, which ...shown in Fig. 2, extends at its outer end ...ugh the apertured projection 140. This ... is formed at its free end with a suitable ...dle 141, and at a point removed from the ... with the collar 142. A coil spring 143 ...rrounds the rod 139, and is compressed be...en the projection 140 and the collar 142, ...reby to impel the rod 139 in a direction ...ards the left in Fig. 2. It will thus be ...n that when the aperture in the leg 138 ...brought into registry with either of the ...ertures 136 and 137 that the rod 139 under ... action of the spring 143 will enter these ...ertures, and thus lock the wringer in the ...ired tilted position. The drain board 135 ...g secured to the wringer will at the same ...e that the wringer is tilted, be automati...y thrown into proper position to accom...date wringing in the direction for which ... wringer is tilted. These two positions ...the wringer are indicated in Fig. 16, it ...g shown in full lines as tilted to one ..., and in dotted lines as tilted to the ...osite side.

The wringer comprises the end bearing 93, which as explained above is rotatably mounted upon the sleeve 92, and at its opposite end is provided with the bearing 143, between which bearings are secured, or if desired, formed integrally therewith, the drain board 135. The lower roll 84 is journaled at one end in the sleeve 92 and at its opposite end in the bearing 143, and as explained above is in driving engagement with the upper roll 85 through the medium of the gears 86 and 87. Formed integrally with the lower bearing 93 is the upwardly extending arm 144, to which is pivotally connected at 145 the upper bearing 146, which at its forward end is provided with the opening 147, (see Fig. 3) there being one of these upper bearings for each end of the wringer. Rotatably connected with the upper bearings 146 by means of pins 148 passing through the openings 147 is the upper roll guard plate 149. Extending upwardly from the lower bearing 93 and on the side opposite from the arm 144 is the arm 150, which at its upper end is provided with the outwardly extending flange 151, through which flange slidably extends the rod 152, provided at its upper end with the hook 153, which hook is adapted to take over the pin 148. Encircling the rod 152 and confined between the flange 151 and head 154 is the coil spring 155, the function of which is to exert a continuous downward pressure upon the rod 152, which rod is provided near its upper end with the projection 156 for engagement with the upper side of the flange 151, whereby to limit this downward movement. There is provided a similar arrangement of bolt and hook at each end of the wringer, as shown in Fig. 2. The pin 148, as best shown in Fig. 16 is slotted at 157, the function of which slot is to cause the remaining portion of the pin to act as a cam surface, whereby as will be understood from an inspection of Fig. 16, a half rotation of pin 148 will release the hook 153 and allow the rod 152 to move downwardly under action of spring 155. This half rotation of pin 148 is effected by grasping the handle 158 of plate 149 and swinging the same through substantially one hundred and eighty degrees towards the front, thus in turn rotating pin 148 to release hooks 153 as explained above. Fig. 16 shows the plate 149 before being rotated. Fig. 17 shows this plate after being rotated approximately one hundred and eighty degrees to the front, and clearly illustrates the manner in which the hook 153 is released. Immediately upon this release of the hook, the upper bearings 146 may be swung upwardly carrying therewith the upper roll 85, thus providing a structure which can be quickly manipulated in order to release any bunched or entangled clothes between the rolls when such is necessary. As is apparent the upper bearings

Page Tightly Bound

may be quickly and easily locked in operative position by a reverse operation of the parts just described. In order to hold the guard plate 149 in proper spaced relation from the upper roll, there is provided on this plate a lug 159 which comes in contact with a suitable bearing surface on the upper bearing in order to hold this plate in the desired position.

In order that the water may be quickly and easily drained from the tank, I have provided in the bottom thereof the opening 160. On the bottom of the vertically extending rod 161 there is secured the valve 162, which is adapted to tightly seat in the upper portion of the opening 160, whereby to prevent any water from passing therethrough until the valve is raised. In order that the valve may be raised to drain the tank, I have provided at the upper end of the rod 161 the lever handle 167, to which, as shown, the upper end of the rod 161 is pivotally connected. The handle 167 is suitably fulcrumed at 163 and is provided in its front portion with the short flange 164, which flange is adapted to engage with the teeth 165 of the rack 166 suitably secured to the side of the tank and adjacent the top thereof. As will be obvious by disengaging this flange from the teeth 165 and elevating the handle 167, the valve 162 will be raised away from the opening 160, and the water permitted to flow therethrough. In closing this valve, all that is necessary is to depress the handle 167 until the valve is closed and lock the flange 164 in engagement with the teeth 165, thus providing means whereby the handle will be firmly secured to hold the valve in closed position. There is sufficient resiliency in the handle 167 to insure the valve 162 being securely locked in closed position.

Having now described my invention, I claim:

1. In a washing machine a washing plate having its front edge in the form of a scoop, ribs in said scoop extending at right angles to and rearwardly from said front edge teeth adjacent said front edge, and the portion of said plate in the rear of said scoop being corrugated in a direction at right angles to said ribs.

2. In a washing machine, a washing cylinder comprising a plurality of circumferential plates, each plate at its forward edge being radially spaced from the rear edge of the next preceding plate, said forward edge being curved to form a scoop, and a plurality of ribs in said scoop, to reinforce the scoop and prevent bending thereof.

3. In a washing machine a washing cylinder comprising a pair of end plates, a plurality of circumferential plates secured between the marginal portions of said end plates whereby to leave an opening substantially of the size of one of said circumferential plates, and a separate circumferential plate removably fitted in said opening, the forward edge of each of said circumferential plates being scoop shaped and spaced from the rear edge of the next preceding plate with a plurality of teeth extending across said space, and a plurality of ribs extending rearwardly from the forward edge of each plate and transversely thereto, inside of said cylinder.

4. In a washing machine a tank, a lid on said tank, and means operable upon the opening of said lid for automatically removing excess moisture therefrom.

5. In a washing machine a tank, a lid slidably mounted on said tank, and means over which said lid slides in opening to wipe excess moisture therefrom.

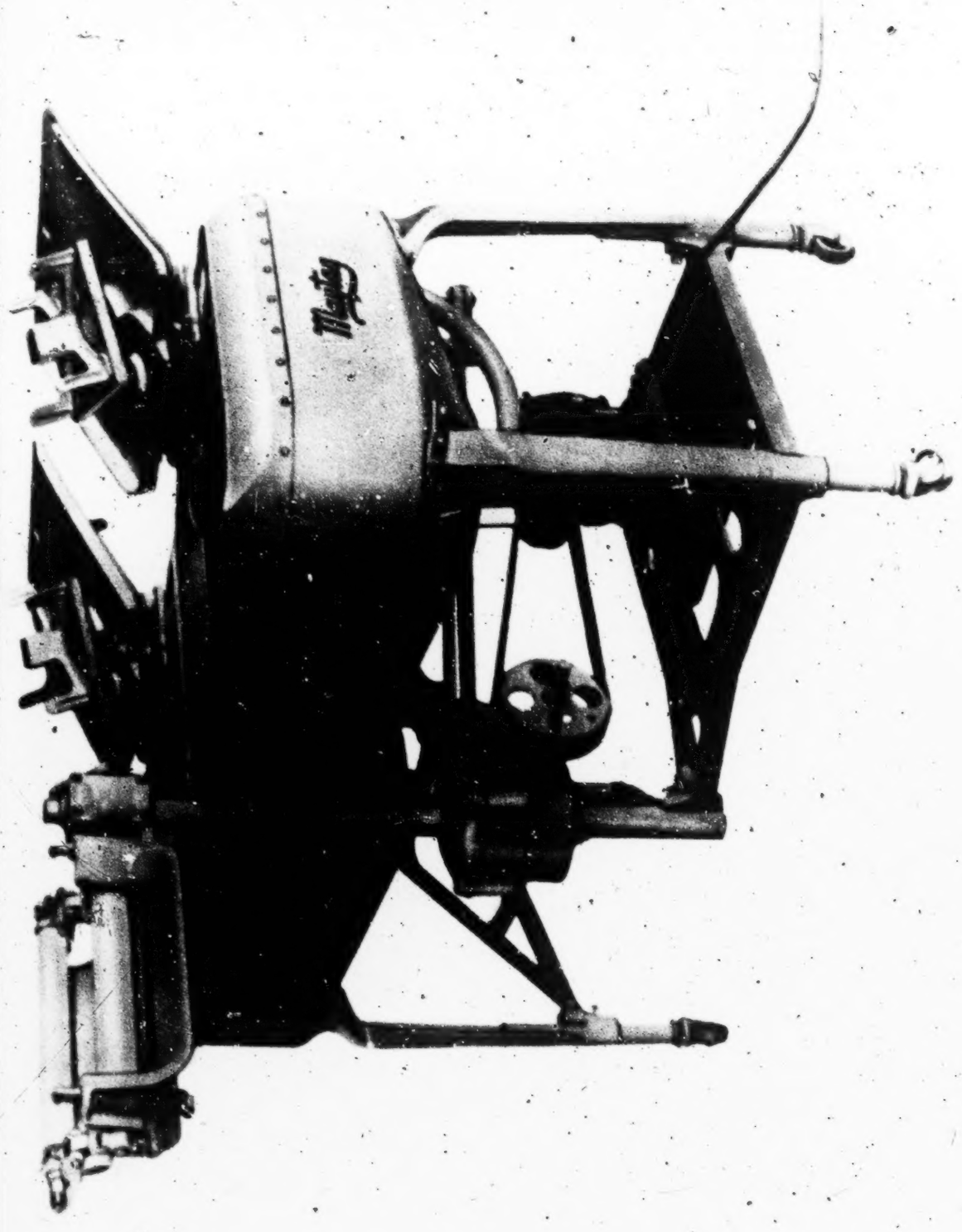
6. In a washing machine a tank, a lid slidably mounted upon said tank and a wiping pad secured to said tank to contact with the underside of said lid during withdrawal whereby to automatically remove excess moisture from said lid in opening the same.

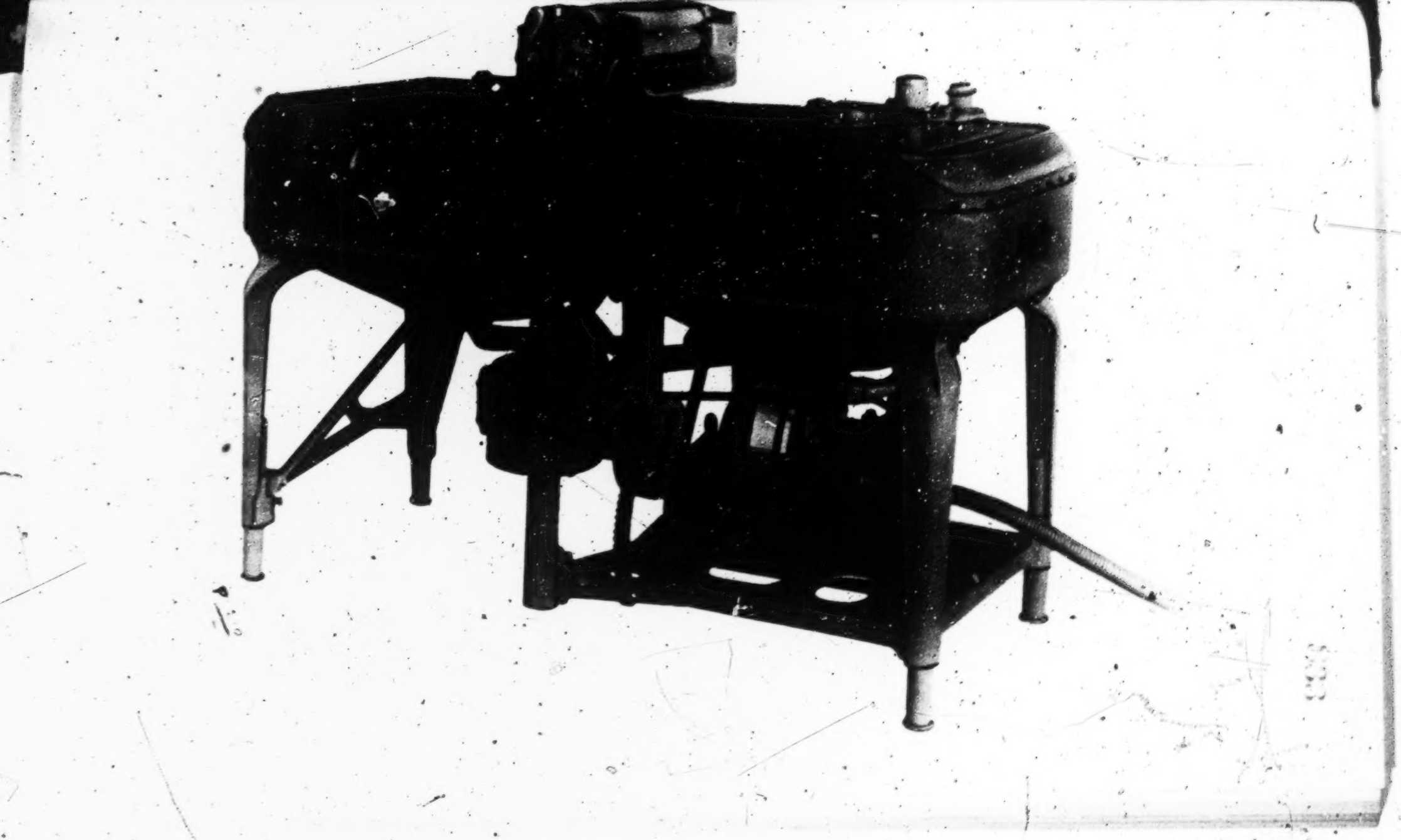
In witness whereof, I hereunto subscribe my name to this specification in the presence of two witnesses.

ALBERT J. DREMEL.

Witnesses:
E. H. MAYTAG,
F. MAYTAG.

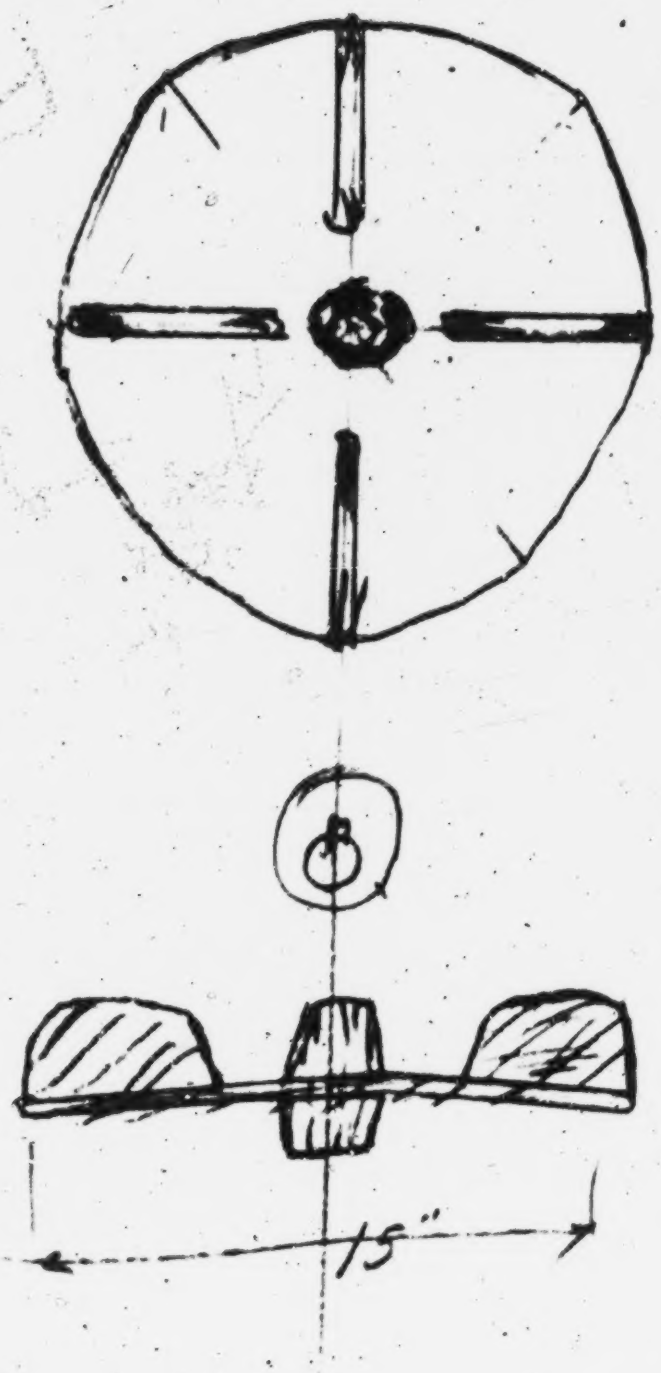
PLAINTIFF'S EXHIBIT No. 210





PLAINTIFF'S EXHIBIT No. 211

834



2503

Plaintiff's Exhibit No. 212.

Paper No. 53.
ETR/LAW

Final Hearing
October 5, 1928.

Patent Office

Oct. 12, 1928
Mailed

IN THE UNITED STATES PATENT OFFICE.

2504

PATENT INTERFERENCE No. 54,316.

Unruh vs. Snyder.
Washing Machine.

Reissue application of Cornelius C. Unruh filed June 18, 1925, No. 38,109, reissue of Patent No. 1,459,483, granted June 19, 1923, on an application filed January 22, 1923, No. 614,-132.

Application of Howard F. Snyder filed June 14, 1922, No. 568,158. 2505

Messrs. Williamson, Reif and Williamson, and Messrs. Milans & Milans for Unruh.

Mr. Wallace R. Lane for Snyder.

The subject matter of this interference is a washing machine of the type involving an agitating member mounted on a vertical axis.

The issue is defined in the following counts:

2506 *Plaintiff's Exhibit No. 212.*

1. The method of cleansing fabrics in a tub consisting in agitating a washing fluid in such a way as to create positively driven violently flowing current moving away from and back to the plane of the source of agitation, and also around the tub in one direction in a plane approximately parallel with the plane of agitation and then causing it to move away from and back to the plane of the source of agitation and in a reverse direction in a plane parallel with the
2507 plane of agitation so as to bodily and forcibly cause the fabrics in the tub to travel in substantially the same paths as the fluid, whereby thorough cleansing of the fabrics is effected without material contact with rubbing surfaces.

2. A washing machine comprising in combination, a container having a substantially uninterrupted inner surface, a rotary reciprocatory disk like impeller mounted through the bottom of the container, so constructed and arranged that when water and materials to be cleaned
2508 are placed in the container and the impeller is reciprocated, the water will first be violently forced laterally and upwardly in one gyratory direction and then laterally and upwardly in an opposed gyratory direction, so that the materials being cleaned will be suspended by the movement of the water, and the water forced through and around the materials to thoroughly cleanse them, while said materials are substantially out of rubbing contact with the mechanical parts of the machine and motor-driven means for rapidly driving the impeller.

3. In a washing machine the combination of a tub for containing a cleansing substance and

the materials to be cleansed, said tub having an outwardly and upwardly inclined portion, an impeller cooperating with the said inclined portion of the tub to force said cleansing substance and materials to be cleansed outwardly in a direction substantially parallel with said inclined portion, and power means for oscillating said impeller. 2509

4. In a washing machine the combination of a tub adapted to contain wash water and goods to be washed, said tub having a flared portion, a liquid impeller in said tub having a depressed portion, said liquid impeller co-operating with said flared portion, to swirl said wash water and goods with a substantially gyratory movement, and power means to alternately rotate said liquid impeller. 2510

5. In a washing machine comprising driving power means, the combination of a tub for containing a cleansing substance, and materials to be cleansed, a liquid impeller, mechanism driven by said power means for oscillating said liquid impeller, said liquid impeller having flanges and a radially depressed portion operative to upwardly swirl said cleaning substance and material. 2511

6. In a washing machine comprising a driving power means, the combination of a tub for containing washing and washable materials, a liquid impeller, means operable to alternately rotate said liquid impeller, said liquid impeller being provided with an upstanding flange and a depressed portion on each side of said flange and

2512 *Plaintiff's Exhibit No. 212.*

operative to swirl said materials with a substantially gyratory movement.

7. In a washing machine comprising driving power means, the combination of a tub for containing a cleansing substance and materials to be cleansed, a liquid impellor, mechanism driven by said power means for alternately rotating said liquid impeller, said liquid impeller having upwardly and radially extending flanges and
2513 a radially depressed surface operative to upwardly swirl said cleansing substance and materials.

8. In a washing machine comprising driving power means, the combination of a tub adapted to contain washing and washable materials, a liquid impeller in said tub and operated by said means, said liquid impeller having a centrally raised portion and radially depressed portion, and operable to swirl said materials with a substantially gyratory movement.

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9. In a washing machine having driving power means, the combination of a tub adapted to contain washing and washable materials, a liquid impeller in said tub and operated by said means, said liquid impeller having a centrally raised portion, a radially depressed portion and flanges extending radially from said centrally raised portion, said liquid impeller operable to swirl said materials with a substantially gyratory movement in said tub.

10. In a washing machine having driving power means, the combination of a tub adapted to con-

tain washing and washable materials, a liquid impeller in said tub and operated by said means, said liquid impeller having a central conoidal portion, an inclined peripheral portion and an intermediate trough portion, said liquid impeller operating to swirl said materials with a substantially gyratory movement in said tub.

11. In a washing machine comprising a driving power means, a tub, an alternating rotary liquid impeller having a plate formed with an 2516
annular depression, a raised central portion and upstanding flanges in said depression, said plate, depression, central portion and flanges operating on the contents of the tub to give the contents a gyratory movement.

12. An agitating member for a washing machine comprising a cup-shaped disk having a frusto-conical portion rising from the center thereof, the vertical elements of which are concave so that the surface of said portion merges into the surface of said disk, and a round up- 2517
wardly tapering portion projecting above said frusto-conical portion and terminating in a rounded surface, and narrow radial wings projecting from said latter portion and extending along the sides thereof and across the surface of said disk and having rounded outer edges merging into the concave surface of said disk.

13. A dolly for a washing machine comprising an annular trough, a stem rising centrally from said trough and having a plurality of circumferentially spaced radial wings projecting therefrom and extending along its sides and across

2518 *Plaintiff's Exhibit No. 212.*

the surface of said trough the top surface of said wings above said trough curving downwardly and inwardly.

14. A rotatable dolly for a washing machine adapted to be disposed in a liquid containing receptacle comprising a dish-shaped member having a central upstanding tapered stem with a rounded upper end, ribs extending across said dish and upwardly along the side of said
2519 stem and having rounded upper edges merging into the rounded surface of said stem.

15. In a washing machine an agitator and power means for imparting alternate rotative movement thereto, said agitator consisting of a substantially disk-like imperforate body and a plurality of liquid impelling projections extending from one face thereof, said projections being of a maximum depth contiguous to the periphery of said body and having their free edges inclined inwardly to the center of the agitator,
2520 leaving the central portion of said body free of water impelling projections.

16. In a washing machine, a tub having side walls and a bottom, a driving shaft extending through said bottom into the tub, an agitator fixed to said shaft to oscillate therewith, power means for oscillating said shaft and agitator, said agitator comprising a substantially circular base having an upstanding central portion, blades extending upwardly from the upper face of said base, the blades being of greatest height adjacent the marginal edge of the base, decreasing in height toward the center and merging into

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said upstanding central portion, the union between the agitator and the shaft permitting removal of the former from the latter by an upward movement, the oscillation of the agitator causing the blades to set up a violent movement of the fluid and tub contents outwardly away from the agitator, upwardly, inwardly, and then back toward the agitator, there also being superposed on this circulatory movement a movement of the fluid and tub contents first in one direction circumferentially of the tub and then in the other, so that the articles being washed will be thoroughly cleansed without any material rubbing of the blades there against.

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17. In a washing machine, a tub, a driving shaft extending into the tub, an agitator secured to said shaft to oscillate therewith, power means for oscillating said shaft and agitator, said agitator comprising a substantially circular body portion having blades extending therefrom on the face presented to the material being washed, the blades adjacent the marginal edge of the body portion being of a substantial dimension in a direction at right angles of the body portion, said body portion being free of any holes or openings of substantial dimensions, said blades and adjacent portions of the body portion of the agitator when the agitator is oscillated throwing the fluid in the tub, and material being washed, violently outwardly from the edge of the agitator whereby it will flow in circulatory paths away from the agitator, along the sides of the tub, then inwardly and back to the agitator, this cycle being continuously repeated.

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18. A washing machine comprising in combination, a container having a substantially un-

interrupted inner surface, a rotary reciprocatory disk like impeller near the bottom of the container having upstanding flanges thereon so arranged as to violently force water in the container laterally and upwardly in one gyratory direction and then laterally and upwardly in an opposed direction, whereby the materials being washed will be substantially suspended by the water and thoroughly cleaned while thus suspended, and motor driven means extending
2525 through the bottom of the container to rotatably reciprocate the impeller.

19. In a washing machine, a tub for containing wash water and goods to be washed, an oscillatory disk like agitator in said tub near the bottom thereof and having a plurality of upstanding water-impelling projections extending from one face thereof, said projections being of substantial height contiguous to the periphery of the agitator and decreasing in height toward the center whereby side faces of substantial area
2526 are provided, and while the agitator is oscillated the water and goods will be vigorously forced laterally upwardly in gyratory paths to violently force the water through, between and around the goods and thoroughly cleanse them while they are sustained in the water free from any substantial contact with rubbing surfaces, and motor-driven means for oscillating the agitator.

20. In a washing machine, a tub having a substantially uninterrupted inner surface and adapted to contain cleansing liquid and materials to be washed, the bottom of the tub merging smoothly into the sides, an oscillatory liquid im-

peller mounted adjacent the bottom of the tub, having on its upper surface upstanding wing-like means of substantial height and length so constructed and arranged that when the impeller is given a rapid rotary osciliatory movement the cleansing liquid and materials to be washed will be violently forced laterally from the impeller then upwardly along the side of the tub, then away from the tub side and back toward the impeller, this cycle being continuously repeated to force the cleansing liquid through and around 2528
the materials to be washed to thoroughly cleanse them while they are substantially out of rubbing-contact with the impeller, and motor-driven means for imparting to said impeller a rapid rotary oscillatory movement.

The interference as originally declared, comprised thirty-one claims as to which the preliminary statement of the junior party, Unruh, alleged no date prior to the senior party's filing date. Notice was therefore given to Unruh that judgment on the record would be issued against him unless he showed cause why this should not 2529
be done. Unruh then filed a motion to dissolve, which was granted as to fourteen counts and denied as to the remainder (present counts 1 to 17). Counts 18 to 20 were added as the result of a motion by Snyder, and, as to these counts, Unruh alleged a date of conception prior to Snyder's filing date and was, therefore, allowed to take testimony.

This testimony clearly established no date prior to Snyder's filing date, for either conception, disclosure or reduction to practice by Unruh and in the memoranda filed in behalf of

2530 *Plaintiff's Exhibit No. 212.*

Unruh, there is no contention that any such date is established.

The sole point raised by these memoranda is the right of Snyder to make the claims in issue. The law examiner, in ruling on Unruh's motion to dissolve and on Snyder's motion to add counts, has affirmed Snyder's right to make each of the counts. In accordance with Rule 130, therefore, this question cannot be reconsidered by the examiner of interferences except in view of evi-
2531 dence which was not before the law examiner. The evidence relied on by Unruh relates to the machines marketed by Snyder's assignor and is not seen to have any bearing on the question of whether or not the Snyder application discloses the invention in controversy. Unruh's testimony is thought to afford no basis whatever for a Holding contrary to that reached by the law examiner on the question of Snyder's right to make the counts.

Priority of invention of the subject matter in controversy is awarded to Howard F. Snyder,
2532 the senior party.

Limit of appeal: November 12, 1928.

W. I. Houston,
Examiner of Interferences.

October 12, 1928.

Plaintiff's Exhibit No. 212. 2533

Appeal No. 850.
Paper No. 62.

Decision.

U. S. Patent Office
Board of Appeals

Dec. 31, 1929
Mailed
MCV 2534

Appeal No. 850

Hearing:

Sept. 6, 1929.

IN THE UNITED STATES PATENT OFFICE

BEFORE THE BOARD OF APPEALS

2535

Unruh v. Snyder

Patent Interference No. 54,316 between the application of Cornelius C. Unruh filed June 18, 1925, Ser. No. 38,109, for re-issue of Patent No. 1,459,483, granted June 19, 1923, on application filed Jan. 22, 1923, Ser. No. 614,132, and the application of Howard F. Snyder filed June 14, 1922, Ser. No. 568,158. Washing Machine.

2536 *Plaintiff's Exhibit No. 212.*

Messrs. Williamson, Reif & Williamson and Messrs. Milans & Milans for Unruh.

Mr. Wallace R. Lane for Snyder.

This is an appeal by the party Unruh from the decision of the examiner of interferences awarding priority of invention in favor of the senior party Snyder.

Unruh is involved in the interference on an
2537 application filed June 18, 1925 for the reissue of his patent No. 1,459,483 granted June 19, 1923 on an application filed January 22, 1923. The application of Snyder in the interference was filed June 14, 1922.

The only question urged in appellant's brief and at the hearing, and therefore the only question that we are called upon to consider, is the right of Snyder to make counts 1, 12, 13 and 14 of the issue. This question was raised by Unruh in a motion to dissolve, thus giving him the right to urge it on this appeal under Rule
2538 130.

Count 1 reads as follows:

1. The method of cleaning fabrics in a tub consisting in agitating a washing fluid in such a way as to create positively driven violently flowing currents moving away from and back to the plane of the source of agitation, and also around the tub in one direction in a plane approximately parallel with the plane of agitation and then causing it to move away from and back to the plane of the source of agitation and in a reverse direction in a plane parallel with

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the plane of agitation so as to bodily and forcibly cause the fabrics in the tub to travel in substantially the same paths as the fluid, whereby thorough cleansing of the fabrics is effected without material contact with rubbing surfaces.

Unruh contends that Snyder has no right to make this process claim because the Snyder application was filed June 14, 1922 for certain alleged improvements in a machine and "it was not until by amendment more than two years later, July 19, 1924, that the alleged invention 2540
of the method was injected into the application."

We agree with the law examiner that the process was disclosed in the original application of Snyder and that count 1 reads on the specification as filed. The fact that Snyder did not present process claims for more than two years after the application was filed is not fatal to his right to make the claim. The decision of Chapman et al. v. Wintroath 252 U. S., 126 is not applicable but that of John R. Williams Co. et al. v. Miller, Du Briel & Peters Mfg. Co. 2541
1901 C. D. 517, cited by the law examiner, is believed to be directly in point.

Count 12 reads:

12. An agitating member for a washing machine comprising a cup-shaped disk having a frusto-conical portion rising from the center thereof, the vertical elements of which are concave so that the surface of said portion merges into the surface of said disk, and a round upwardly tapering portion projecting above said frusto-conical portion and terminating in a

2542 *Plaintiff's Exhibit No. 212.*

rounded surface, and narrow radial wings projecting from said latter portion and extending along the sides thereof and across the surface of said disk and having rounded outer edges merging into the concave surface of said disk.

Unruh contends that this count is not readable on Snyder's disclosure.

We note that the last line of the count specifies that the wings have "rounded edges merging into the concave surface of said disk." The
2543 law examiner points out that the edges merge into the disk at 55 in Fig. 4 of Snyder and are rounded at their upper ends. He held that the "count does not specify that the rounded part of the outer edges merge into the concave surface of the disk."

We are unable to concur in this holding of the law examiner. In our opinion the count calls for a construction in which the rounded outer edge merges into the concave surface of the disk. It is not fairly shown in appellant's construction where a straight outer edge merges
2544 into the concave surface of the disk and is surmounted by a rounded corner. We accordingly find that Snyder cannot make count 12.

Count 13 reads:

13. A dolly for a washing machine comprising an annular trough, a stem rising centrally from said trough and having a plurality of circumferentially spaced radial wings projecting therefrom and extending along its sides and across the surface of said trough the top surface of said wings above said trough curving downwardly and inwardly.

Plaintiff's Exhibit No. 212. 2545

The last line of this count calls for "the top surface of said wings above said trough curving downwardly and inwardly." In holding that Snyder can make this count the law examiner said—"The top surface of the wings above the trough curve downwardly and inwardly as shown at 56 at the left of Fig. 4." While it is true that the straight horizontal upper edge or surface of the wing is shown as joined to the straight inclined surface at 56 by a curve rather than an angle, this curve constitutes too small 2546
a part of the top surface of the wing to fairly support the count. Appellant does not contend that this portion of the count reads exactly on his disclosure but he states (brief, page 42)—

> While it is obvious that the edges of the wings 56 do not conform to the arc of a circle, they are the full equivalent of the curved edges or lobes 17 of the Unruh patent on which the claim purports to be based, and function absolutely the same.

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It is well settled in interference practice, however, that no element of the issue can be disregarded and that the question of equivalency will not be considered in determining a party right to make the count of the issue (Streat v. Freckleton 1899 C.D., 85; Collum v. Thurman 1907 C.D., 330; Wilson & Forrest v. Ellis 1915 C.D., 69 and Bijur v. Rushmere 1918 C.D., 122).

It is further noted that counts 12 and 13 are claims 5 and 6, respectively, of Unruh's original patent. Therefore, if there is any doubt as to the meaning of these counts they should be

construed in accordance with Unruh's disclosure.

Count 14 reads:

> 14. A rotatable dolly for a washing machine adapted to be disposed in a liquid containing receptacle comprising a dish-shaped member having a central upstanding tapered stem with a rounded upper end,
> 2549 ribs extending across said dish and upwardly along the side of said stem and having rounded upper edges merging into the rounded surface of said stem.

This count is thought to read fairly on the Snyder disclosure. Concerning the last portion of the count it is noted that the upper edges of the ribs are rounded or curved where they merge into the rounded surface of the stem.

In our opinion Snyder has the right to make counts 1 and 14 but does not have the right to
2550 make counts 12 and 13.

The decision of the examiner of interferences awarding priority in favor of Snyder is affirmed as to counts 1 and 14, and is reversed as to counts 12 and 13.

M. J. Moore)
Assistant Commissioner)
W. S. Ruckman) Board
Examiner-in-Chief) of
Eugene Landers) Appeals
Examiner-in-Chief)

December 31, 1929

Plaintiff's Exhibit No. 212. 2551

Appeal No. 850 Paper No. 65
Decision.

U. S. Patent Office
Board of Appeals

Jan 31 1930
Mailed

Appeal No. 850

Petition for
Rehearing.

IN THE UNITED STATES PATENT OFFICE 2552

BEFORE THE BOARD OF APPEALS

Unruh v. Snyder

Patent Interference No. 54,316 between the application of Cornelius C. Unruh filed June 18, 1925, Ser. No. 38,109, for reissue of Patent No. 1,459,483, granted June 19, 1923, on application filed Jan. 22, 1923, Ser. No. 614,132, and the application of Howard F. Snyder filed June 14, 1922, Ser. No. 568,158. Washing Machine. 2553

Messrs. Williamson, Reif & Williamson and Messrs. Milans & Milans for Unruh.
Mr. Wallace R. Lane for Snyder.

The party Snyder has presented a petition for a rehearing of the matter decided by us December 31, 1929.

After a careful consideration thereof we find no reason presented therein which leads us to

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2554 *Plaintiff's Exhibit No. 212.*

believe that our decision is in error or that a different conclusion would result if a rehearing were granted.

As noted in our decision, the counts 12 and 13, in question, are claims of Unruh's original patent. The structure claimed is clearly disclosed in Unruh's drawing and the radial ribs 17 are described in the specification and stated to be "of lobe shaped formation." These counts are specific to Unruh's construction. For rea-
2555 sons stated in our decision they are not supported by the disclosure of Snyder and he has no right to make them. Under the long established practice noted in the decisions of both the Patent Office and the Courts, cited by us, these limitations in the counts not disclosed by Snyder cannot be disregarded in considering the right of Snyder, who copied the claims for interference purposes, to make the same. Under the above circumstances the matter of whether Unruh disclosed these limiting features prior to the filing of his application is immaterial.

2556 In lines 4 and 24, page 3 of our decision, the word "appellant" should read *appellee*. It is perfectly clear by the context that the party Snyder was intended in both instances. No confusion has resulted and this error affords no ground for a rehearing.

The petition is denisd.

January 31, 1930

M. J. Moorz)
Assistant Commissioner)
W. S. Ruckman) Board
Examiner-in-Chief) of
Eugene Landers) Appeals
Examiner-in-Chief) .

Plaintiff's Exhibit No. 212. 2557

DEPARTMENT OF COMMERCE

UNITED STATES PATENT OFFICE

To all persons to whom these presents shall come, Greeting:

THIS IS TO CERTIFY that the annexed is a true copy from the records of this office of Protest on Behalf of 1900 Corporation, filed June 19, 1931, in the matter of Application Serial Number 568,158.

2558

IN TESTIMONY WHEREOF I have hereunto set my hand and caused the seal of the Patent Office to be affixed, at the City of Washington, this tenth day of July, (SEAL) in the year of our Lord one thousand nine hundred and thirty-three and of the Independence of the United States of America the one hundred and fifty-eighth.

CONWAY P. COE
Commissioner of Patents.

ATTEST:

2559

D. E. WILSON
Chief of Division.

Hon. Commissioner of Patents,

Sir:

Re: Snyder Application Serial No. 568,158, filed June 14, 1922.

On behalf of the 1900 Corporation, assignee of the Davis Patent No. 1,748,442, I enter this protest against the allowance in the above entitled Snyder application, of certain claims which I understand have been awarded to

2560 *Plaintiff's Exhibit No. 212.*

Snyder in the Unruh v. Snyder Interference No. 54,316.

The ground for this protest is that the claims in question cover subject matter which was common to the disclosures of the said Snyder and the said Davis in the Snyder v. Davis Interference No. 52,807, which was decided in favor of Davis.

Accordingly, under well established Patent Office practice, as reiterated in the recent opin-
2561 ion of the Board of Appeals in *ex parte* Joseph Sachs (U. S. Daily, June 18, 1931, page 6) Snyder, the unsuccessful party in this interference, is estopped to make claims which read upon the subject matter of the interfering applications, and therefore could have been included among the interference counts.

Among the claims against which this protest is made, are the following, which appear at pages 278-283 of the printed Transcript of Record on appeal to the United States Court of Customs and Patent Appeals in the Interfer-
2562 ence of Unruh v. Snyder No. 54,316:

Counts 1, 2, 3, 4, 6 and 20.

The applicability of these claims to the disclosures of Snyder and Davis, which were involved in the interference between those parties, is too obvious to require comment. For example, count 6 is directed squarely to the issue of the Snyder-Davis interference.

Very respectfully,

MERRILL E. CLARK,
20 Exchange Place,
New York City, N. Y.

June 19, 1931.

J. S. Hittell,

Washing Machine,

No. 61,067. Patented Jan. 8, 1861.

Fig 1.

Fig 2.

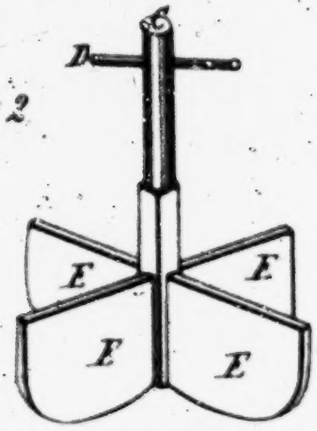
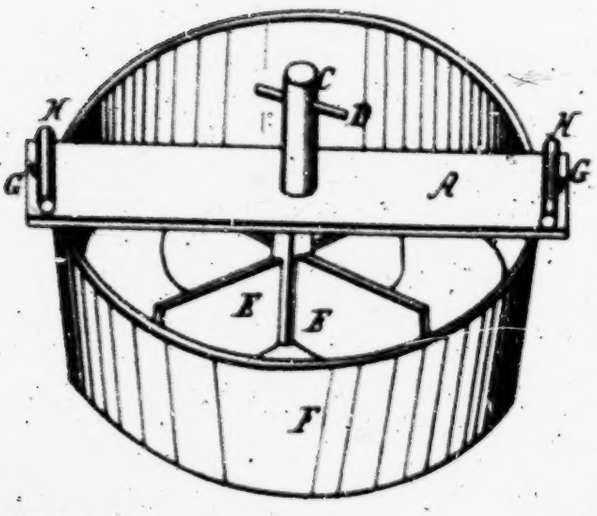


Fig 3



Witnesses;
J. Wm. Longie
N. B. Lonnington

Inventor,
John S. Hittell

856

United States Patent Office.

JOHN S. HITTELL, OF SAN FRANCISCO, CALIFORNIA.

Letters Patent No. 51,067, *dated January* 8, 1867

IMPROVED WASHING MACHINE.

The Schedule referred to in these Letters Patent and making part of the same.

Be it known that I, JOHN S. HITTELL, of the city and county of San Francisco, State of California, have invented a new and useful Washing Machine, consisting of an upright paddle-wheel, which can be placed in any common wash-tub, and is much more expeditious than the wash-board, thus furnishing a valuable, cheap, and easy addition to every household in which washing is done.

In the accompanying drawings representing the machine, A is a cross-board which passes over the top of the tub, and is held in its place by the bails, which turn up over the ends. B is a hole in the middle of the cross-board, through which hole the axle of the wheel passes. C is the axle of the wheel, held in its place while in use by the cross-board at the top and by a pivot or socket at the bottom of the tub. D is the handle passing through the axle, and made to be grasped by a hand at each end. E E E E are four paddles fastened to the axle. F is a common wash-tub. G G are pegs or nails driven into the ends of the cross-board to prevent the bails from slipping down over the ends after the board is fixed in its place.

I claim the combination of the wheel (made of the axle C, the paddles E E E E, and the handle D) with the cross-board A, and a pivot or socket at the base of the axle to keep it in place.

JOHN S. HITTELL.

SAN FRANCISCO, September 20, 1866.

Witnesses:

H. B. LIVINGSTON,
J. W. MCKENZIE.

R. E. Ferguson,

Washing Machine,

No. 83,145. Patented Oct. 20, 1868.

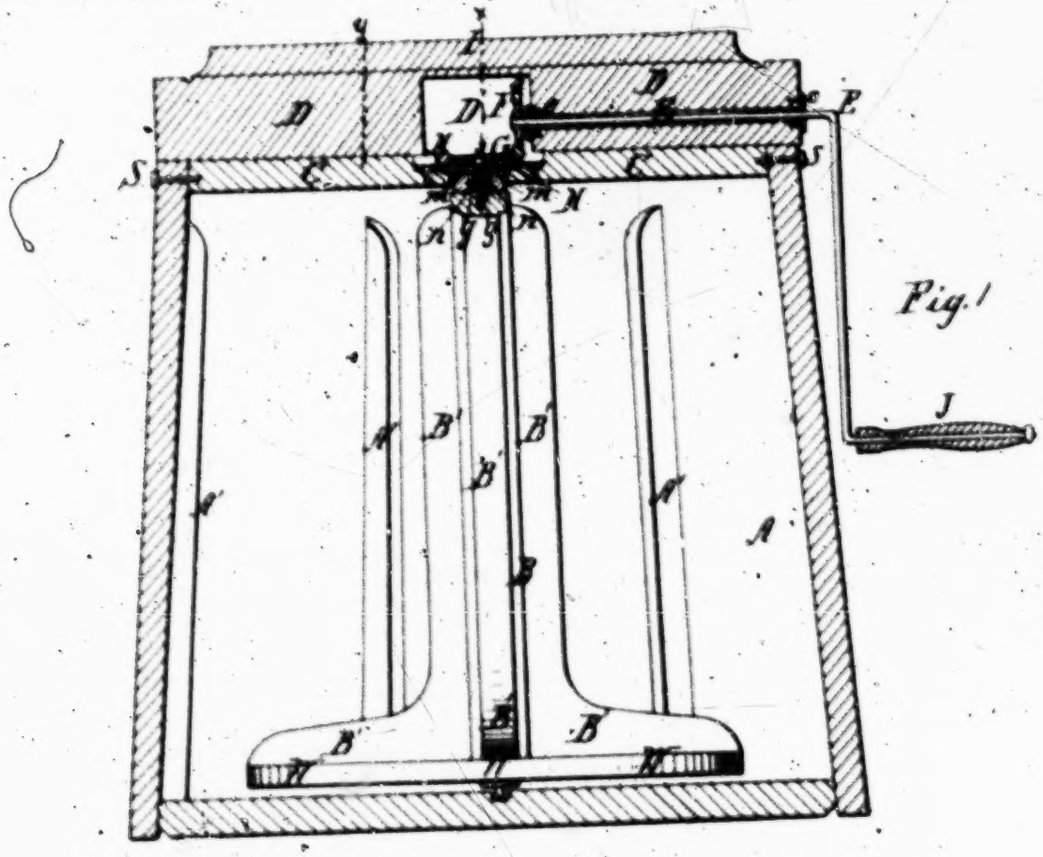


Fig. 1

Fig. 2

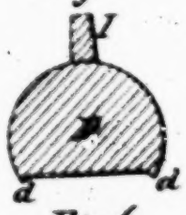


Fig. 3

Fig. 4

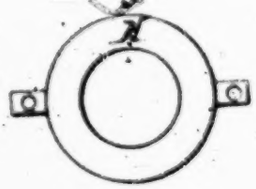


Fig. 5

Fig 6

Witnesses
N. E. Marr-
W Briers

Inventor
Robt. E. Ferguson

United States Patent Office.

ROBERT E. FERGUSON, OF CHICAGO, ILLINOIS.

Letters Patent No. 83,145, *dated October* 20, 1868.

IMPROVED WASHING-MACHINE.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that I, ROBERT E. FERGUSON, of Chicago, in the county of Cook, and State of Illinois, have invented a new and useful Improvement in Washing-Machines; and I do hereby declare and make known that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and the letters and figures marked thereon, which form part of this specification.

To enable those skilled in the art to understand how to construct and use my said improvement, I will proceed to describe the same with particularity, making reference, in so doing, to the aforesaid drawings, in which—

Figure 1 represents a central vertical section of my invention;

Figure 2 is a similar section, taken at the line *x* in fig. 1;

Figure 3 is a section taken at the line *y* in said fig. 1;

Figure 4 is a top view of the metallic head or cap on the vertical shaft of the washer;

Figure 5 is a plan view of the metallic journal-box in which said cap revolves; and

Figure 6 represents a bottom view of the bevelled-gear wheel, fixed upon the top of the said vertical shaft.

Similar letters of reference in the several figures denote the same parts of my said invention, which, however, relates simply to the upper part of the machine, or the attachment for operating the same, without reference to the lower parts.

My said invention consists in a novel arrangement or device, whereby the iron parts of the machine, or the shaft and gearing for operating the same, are entirely covered and protected from the suds or water in the machine, thus preserving them from rust and corrosion, and preventing the injury to the clothes which would be done by bringing them in contact with the rust of the parts, or from having the water mixed with the rust while the washing is being done; the said casing or enclosure being at the same time so constructed and applied upon the machine as to constitute the journal-boxes or bearings for both the crank-shaft and the vertical washer-shaft, and also their gearing, so that by removing said protecting device from the machine, it being made readily removable for that purpose, the entire operating-parts of the washing-machine are therewith removed from the tub, as when it is desired to cleanse or wash out the same.

Another important advantage of the arrangement above specified of the casing and bearings of the shafts and their gearing, its position being central over the top of the tub, consists in the fact that thereby a rib or flange, upon which a wringer can be secured, can be arranged centrally over the tub, so that the water wrung or expressed from the clothes passing through the wringer will fall into the tub, instead of partially outside of the same, as is the case when the wringer is attached to the edge of the tub, or to a device secured upon the edge of the tub, as has heretofore been done.

A represents a vertical cylindrical tub, which is provided with a series of interior ribs A', and has at the centre of the bottom a step or box, in which the lower end of the vertical shaft B rests, as shown, said shaft being provided with a circular horizontal disk W, near the bottom of the tub, and also with a series of vertical beaters B', which agitate the water as the shaft B is revolved.

Upon the top of said shaft B, which rises to the under side of a wooden cross-piece, C, which is secured at the top of the tub by screws S S, as shown, is formed a rectangular nib or projection, which fits into a rectangular hole *n* in the iron cap L, so as to fix said cap firmly to the shaft B.

The said cap L has a circular riser marked *m*, which fits into a metallic collar, H, secured in a recess upon said cross-bar C, as shown, said collar resting upon the cap L, so as to keep the shaft B in place, while the said circular riser or journal *m* turns freely in the metallic-box or collar H.

The cap L passes up in a circular opening in the under side of the cross-bar C, just large enough to receive said cap, and is almost wholly concealed in the bar C, but this cap is made of galvanized iron, so that although its lower side is exposed to the water, no bad results can follow, as the said exposed surface of the cap will not rust.

G represents a bevelled-gear wheel, provided with a rectangular nib, *g*, which fits into the corresponding hole *n* in the cap L, and said wheel G and cap L are firmly and rigidly secured to the top of the shaft B by means of a screw, *s*, passing down through them and into said shaft, as shown in the drawings.

D represents a bar of wood, of a circular form, having a flat lower face, which lies close down upon the top of the cross-bar C, said bar being provided with flanges *d*, as shown in fig. 3, which fit down upon each side of said cross-bar C, to keep it in place upon said bar, and prevent the water from spattering in upon the gearing through the space or crack between the parts C and D.

At the middle point of the bar D is formed a chamber, D', in the lower part of which the aforesaid gear-wheel G lies, and upon one side of which a vertical gear-wheel, bevelled so as to engage with G, marked F, is supported upon a shaft, E, which passes through from one end of the said bar D, as shown, suitable journal-boxes *e e* being arranged, in which the shaft E may be revolved by turning the crank-handle J.

Thus the turning of the handle 3 will cause the washer-shaft B to revolve as desired, while all the gearing and metal parts are secluded and preserved from contact with the water while the machine is in operation, as hereinbefore mentioned.

The parts C D are firmly secured together by screws or otherwise, and the whole properly secured to the tub by means of screws S S, as aforesaid.

By taking the screws or fasteners which secure the pieces C D together out, the part D, with its shaft and wheel F can be removed, when, by taking the screw s from the top of the shaft B, the wheel G can be removed, so as to permit the cross-bar C to be removed independent of the washer-shaft and its attachment.

Upon the top of the coverer D is arranged a rib or flange, I, whereunto any wringer can be secured, for the purpose of wringing the clothes, the protecting-cover D C preventing the water from corroding the metal of the gearing and other parts of the device, which rib or flange I, from its being secured centrally over the tub, causes the water from the wringer to fall into the tub, which central position of the rib could not be attained except for the employment of the covering-bar C D, which sustains the rib, and at the same time protects the gearing and shaft E from the water expressed from the wringer.

Having described the construction and operation of my invention, I will now specify what I claim, and desire to secure by Letters Patent.

I claim the arrangement of the wringer-rib I centrally over the tub of the machine, when supported upon a bar or bars C D, which at the same time encloses and protects the gearing of the machine from the water expressed from the clothes by the wringer, all constructed and operating as and for the purposes specified.

ROBT. E. FERGUSON.

Witnesses:
W. E. MARRS,
H. BRUNS.

C. W. Hermance.

Wash Boiler.

No. 88,478 Patented Mar. 30, 1869.

Fig 1

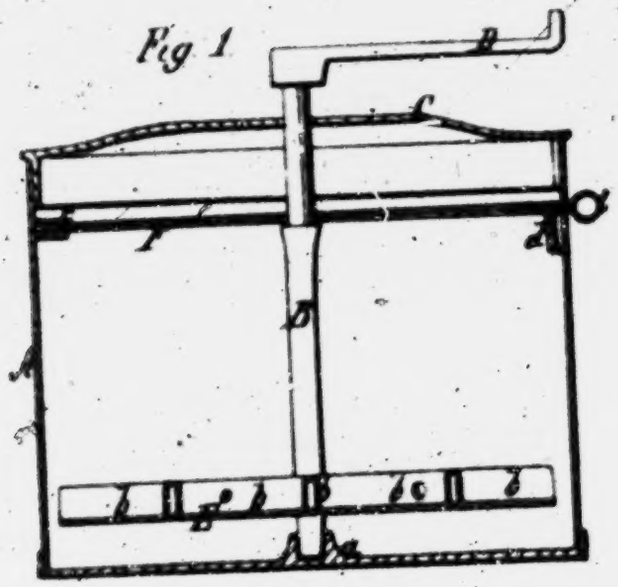
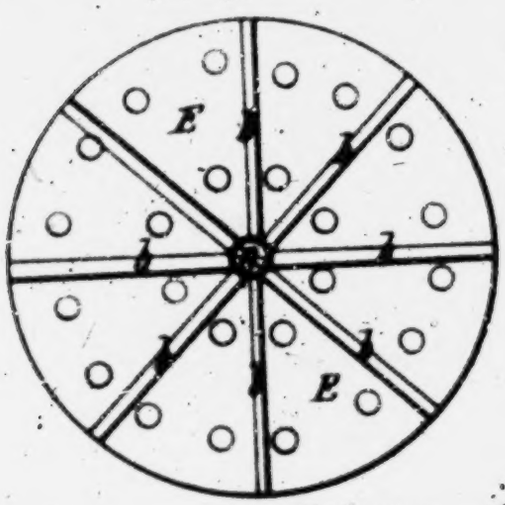


Fig 2



Witnesses,
Cornelius Bay
John M Stout

Inventor,
C. W. Hermance
per Alexander Wilson
Atty

UNITED STATES PATENT OFFICE.

C. W. HERMANCE, OF SCHUYLERVILLE, NEW YORK.

IMPROVED WASHING-MACHINE.

Specification forming part of Letters Patent No. **88,478**, dated March 30, 1869.

To all whom it may concern:

Be it known that I, C. W. HERMANCE, of Schuylerville, in the county of Saratoga, and in the State of New York, have invented a new and useful Improvement in Wash-Boilers; and do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

The nature of my invention consists in the construction and general arrangement of a "wash-boiler," with a vibrating metallic wheel, on which the clothes are placed.

In order to enable others skilled in the art to which my invention appertains to make and use the same, I will now proceed to describe its construction and operation, referring to the annexed drawings, which form a part of this specification, and in which—

Figure 1 is a vertical section, and Fig. 2 a plan view.

A represents a wash-boiler of any dimensions desired, having in the center of its bottom a socket, *a*, or its equivalent, for the insertion of the lower end of the vertical shaft B, which passes upward through a hole in the lid C, and is at its upper end provided with a crank, D, for the purpose of turning or rotating said shaft.

On the shaft B, near its lower edge, is placed a wheel, E, of circular form, said wheel being made of tin, galvanized iron, or other suitable metallic substance, and perforated, as shown in Fig. 2. This wheel is on its upper side provided with a series of cleats or ribs, *b b*, radiating from the center to the outer periphery of the wheel. These cleats or ribs are also formed of metal, and bent over so as to form a channel or a hollow flattened tube, the inner end being closed and the outer open. Through each of the cleats or ribs *b b* are one or more holes, as seen in Fig. 1.

Across the boiler A, near its top, is placed a cross-bar, F, through the center of which the vertical shaft B passes, the said cross-bar forming the bearing for the shaft. One end of said cross-bar is inserted in a socket, *c*, on the inside of the boiler, and the other end, being bent downward, is inserted in a loop, *d*, on the other side, inside of the boiler. A pin, E, is then inserted from the outside of the boiler on top of the end of the cross-bar, or into a loop on the same, thus holding the cross-bar firmly in its place.

The clothes to be washed are laid on the cleats or ribs *b b* on the wheel E, said ribs holding the clothes up from the wheel, thus preventing them from clogging up the holes or perforations in the wheel, but allowing at all times a free passage of the water through the same.

The operation of my machine is very simple. The operator, by the use of the crank D, turns the wheel E, say, about one-half around, then back again, and so on rapidly from side to side, causing a vibrating or reciprocating motion of the wheel. This produces a tremendous agitation of the suds as the shaft B carries not only the wheel E, but also the water and clothes, with it. This agitation is further increased by the peculiar construction of the cleats or ribs *b b*. These cleats being hollow, the water is thrown outward by the centrifugal force, and then rushes in again through the open outer ends and perforations.

The wheel E being made of metal, it will not be affected by the action of boiling water, and it cannot shrink or swell, which is always the case with a wooden wheel.

I am aware that machines have been constructed for washing clothes by the friction of a disk with radial ribs attached to a vertical shaft; these, therefore, I do not claim; nor do I claim constructing a wash-machine of metal, as this also has been done.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

The arrangement of the thin perforated metal disk E, with its radial hollow tubes *b b*, open at their outer ends and perforated, all attached to the vertical shaft B, passing through the movable bar F and within the wash-boiler A, as shown and described.

In testimony that I claim the foregoing I have hereunto set my hand this 26th day of February, 1869.

C. W. HERMANCE.

Witnesses:
J. H. D. KIDDER,
G. F. WATSON.

E. H. Covel.

Washing Mach.

No. 95,565. Patented Oct. 5, 1869.

Fig. 1.

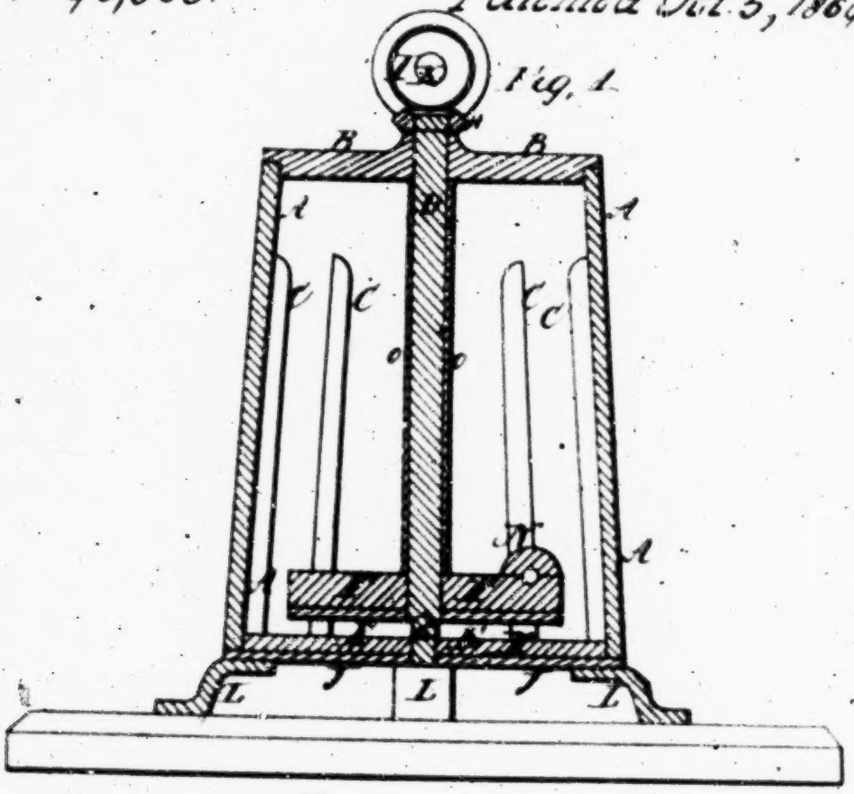


Fig. 2

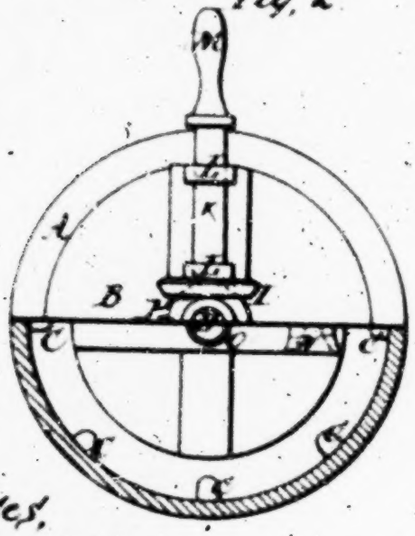


Fig. 3

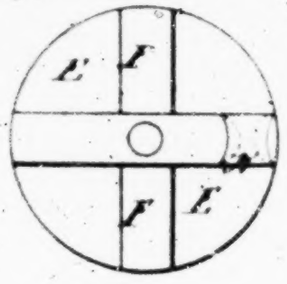


Fig. 4

Witnesses.

Kate A. Jones

John A. Anderson Jun.

Inventor.

Elbert Covel

United States Patent Office.

E. HALL COVEL, OF NEW YORK, N. Y.

Letters Patent No. 95,865, *dated October* 5, 1869.

IMPROVED WASHING-MACHINE.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that I, E. HALL COVEL, of the city, county, and State of New York, have invented a new and improved Washing-Machine; and I do hereby declare the following to be a full and exact description thereof, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1 is a vertical section of a machine embodying my invention.

Figure 2, a plan view, with part broken away, showing the vertical ribs.

Figure 3, a plan view of the dashers, removed.

Figure 4, a view showing the funnel-shaped thimbles.

Like letters of reference indicate corresponding parts in all of the figures.

My invention has for its object the cleansing of clothing without the laborious process of rubbing, by the agitation of currents of water, produced by a suitable rotary device, all hereinafter described.

As represented in the drawings—

A is a vessel, made of a cylindrical or any other suitable form, having a removable top or cover, B.

Around the interior sides of the vessel are affixed four or more vertical ribs *c c c c*.

Upon a suitable step or bearing, C, in the centre of the bottom, is arranged a shaft, D, which passes through the cover B, and is provided upon its upper end with a bevelled pinion, H, which gears with the driving-wheel I, having a crank, M, on its axis K, by which motion is imparted thereto.

This shaft is surrounded by a sleeve, *o*, which is affixed to a cross-piece at the top of the vessel, so as to maintain it in a fixed position, thus preventing the tendency of the clothing to follow the current of the water, and become wound around the shaft during its revolution.

At the lower extremity of the shaft D is affixed a disk, E, and upon this, extending radially from the shaft, are four, or any desirable number of dashers, *F F*.

These dashers are concavely formed at their sides or faces, or so inclined as to elevate or force the water upward in a vertical direction during their revolution. Being alike on both sides, the same result will follow if the dashers are rotated in either direction, but if preferred, they may be made with one side only curved or inclined, with the same effect if rotated always in the same direction.

Attached to the dashers, or to the upper side of the disk, are one or more double-mouthed funnels or thimbles N.

The operation of my invention is as follows:

The vessel being partially filled with suds or water, the shaft D is put in motion by revolving the crank M.

The curved or inclined surfaces of the dashers, in their revolution through the water, force upward that portion of the liquid that they meet in their course, while those portions which are immediately in front of the aperture of the funnel or thimble, pass through it, producing a horizontal current.

By this arrangement, two diverse and opposite currents, one vertical, and the other horizontal, are produced, while the fixed ribs *c c c c* arrest the circulatory current, and maintain a counter or reverse horizontal one.

The effect of these three agencies is to cause a violent agitation of the liquid, which effectually removes all impurities from the fabrics subjected to its operation in a rapid manner, and with a slight expenditure of labor.

I construct the cylinder of the vessel with a compound bottom, consisting of the part K and the sub-disk or supporting part J.

The legs L are secured to the latter piece by bolts or otherwise, when the vessel is placed upon it, and may be attached, if desired, by nails, driven into the staves or sides, from the under side of the part J.

This invention is simple in construction, and the operation of cleansing is more rapid and effectual than the ordinary means, while clothing of the most delicate texture can be washed without liability of injury.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In combination with the shaft D, disk E, and inclined dashers F, the stationary sleeve *o*, substantially as and for the purpose hereinbefore described.

2. In combination with the dashers *F F* and disk E, the funnel-shaped thimbles, substantially as shown and described.

Witnesses: E. HALL COVEL.

JOHN A. WIEDERSHEIM,

KATE N. JONES.

C. F. Dodge,

Washing Machine.

No. 95573 Patented Oct. 5. 1869.

Fig 2

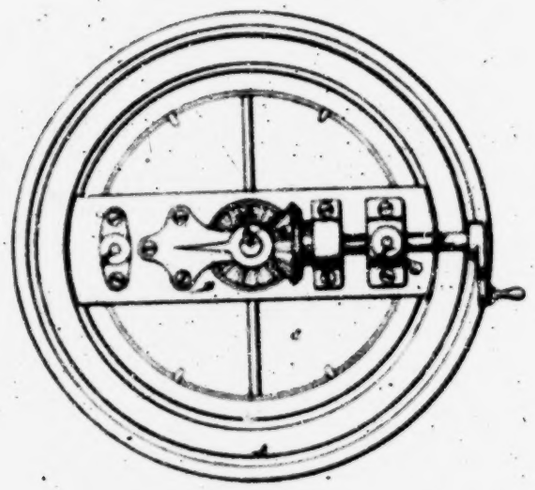
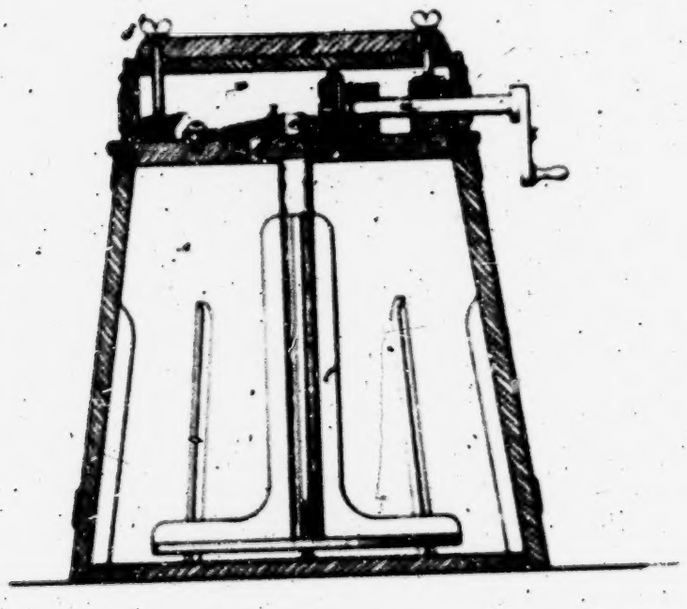


Fig 1



Witnesses
Fred Haynes
R. H. Adams

Chas. F. Dodge

United States Patent Office.

CHARLES F. DODGE, OF NEW YORK, N. Y.

Letters Patent No. 95,573, *dated October* 5, 1869.

IMPROVED WASHING-MACHINE.

The Schedule referred to in these Letters Patent and making part of the same.

all whom it may concern:

Be it known that I, CHARLES F. DODGE, of the , county, and State of New York, have invented a and useful Improvement in Washing-Machines, which the following is a full, clear, and exact de- ption, reference being had to the accompanying ing, forming part of this specification, and in ch—

Figure 1 represents a sectional elevation of a wash- machine constructed in accordance with my im- ement; and

Figure 2, a plan of the same, with a box that en- es the gearing, and serves as a support for the ment of a wringer, removed.

ilar letters of reference indicate corresponding ts.

y invention relates to a well-known description of hing-machine; and consists in a special construc- of certain parts, whereby increased facility is ded for fitting together or taking apart the ma- e, and space reduced in packing the same for portation.

ferring to the accompanying drawing—

represents the tub of the washer, which may be ed by loose or hinged lids, arranged on either of a cross-bar, B, that is secured by screws made- ass through the sides of the tub, said bar serving arry; by suitable bearings thereon, the operating- ft *a*, with its crank or handle, *b*, and bevel-pinion by which the revolving-stirrer C is driven through vel-pinion, *d*, on its vertical shaft, *e*.

aid stirrer is made up of a disk and wings that op- e in connection with vertical ribs, arranged on or and the inside of the tub, or it may otherwise be ably constructed.

is a box or barrel-shaped covering, set on top of bar B, and serving to enclose the gearing, also ering as a support for the attachment of a wringer r through a rib, *f*.

ch constitutes an ordinary and well-known de- tion of washing-machine that, while perfect as rds its working qualities, presents, as the same heretofore been constructed, certain difficulties or ctions, as regards fitting together or taking apart packing of said machines for transportation, which the object of my invention to remove.

ius, it has been customary to attach the box or -like covering D, by pins made permanent in bar B, and arranged to project upward through oles for bobbing down nuts to screw on their upper s.

his is objectionable, both as to the fitting and taking apart the machine, inasmuch as the box is apt to stick on the pins as well as to the surface of the bar B, but mainly on account of the projection of said pins above the lids or upper edge of the tub, that not only interferes with the packing of the machines in the crates they are usually transported, but exposes them to being bent or broken, if left uncovered, by the box D, which, accordingly, is left secured to its place on the bar B, that cannot very conveniently be removed, or, if detached, requires some skill and considerable labor to fit the parts together again, owing to the upper journal of the stirrer-shaft *e* being invariably below the driving-pinion *d*, which, accordingly, would have to be first taken off.

All these difficulties I obviate, first, by substituting for the fast pins and upper nuts, which have been used to hold the barrel or box D to the bar, thumb-screws *f f*, capable of operation from above, and arranged to screw into fixed nuts or boxes, *g g*, connected with the bar B, so that on unscrewing and lifting out or removing said thumb-screws, the box D is at liberty to be taken off, and no fastening-pins are left projecting or standing.

Furthermore, the upper journal, *h*, to the vertical stirrer-shaft *e*, I arrange above the pinion *d*, and connect it with the bar B, so that on taking out the end screws, which secure said bar to the tub, and raising the bar, the journal *h* is slipped off or over the shaft *e*, without any disturbance of the pinion *d*.

By this construction I am enabled to detach and pack within the tub both the box D and the bar B, with its attachments, and so incline or tilt the stirrer and its shaft as that the whole are readily stowed away within the tub, and below the upper edge thereof, which, in packing a number of such machines within a crate, largely economizes space and reduces freight, also affords protection against breakage or injury, nor is this accompanied by any difficulty in fitting the parts together on arrival at their destination or placing of the machines in working order on the market.

What is here claimed, and desired to be secured by Letters Patent, is—

The combination, with the box or barrel D of the machine, and cross-bar B, of the thumb-screws *f f*, arranged to enter from above, and made to fit boxes or nuts connected with said bar, substantially as shown and described.

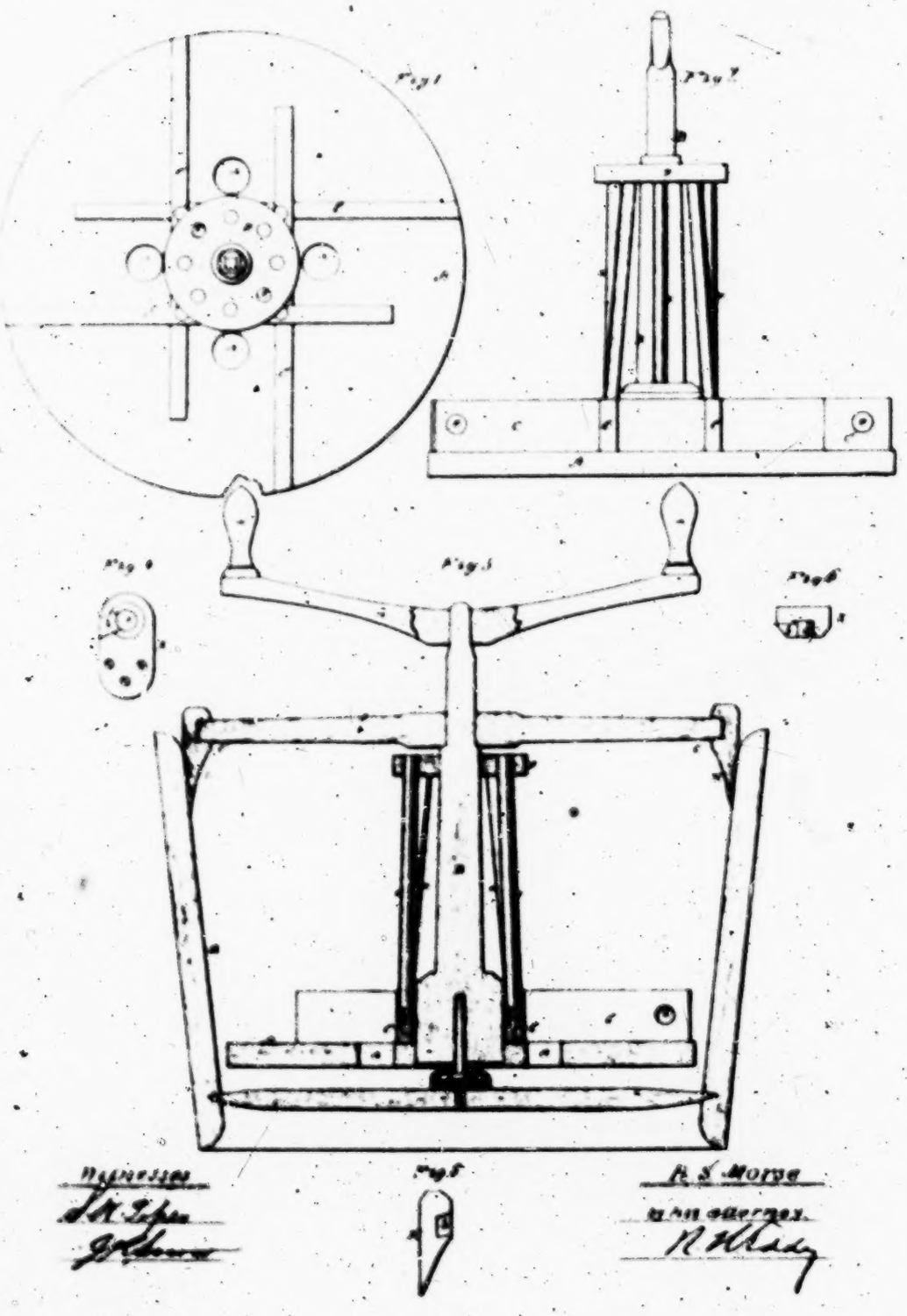
CHAS. F. DODGE.

Witnesses:
FRED. HAYNES,
HENRY PALMER.

F. S. Morse,

Machine Machine.

No. 106,853. Patented Aug. 30. 1870.



United States Patent Office. 867

RUSSELL S. MORSE, OF CHELSEA, MASSACHUSETTS.

Letters Patent No. 106,853, *dated August* 30, 1870.

IMPROVED WASHING-MACHINE.

The Schedule referred to in these Letters Patent and making part of the same.

To all persons to whom these presents may come:

Be it known that I, RUSSELL S. MORSE, late of Wilton, of the State of Maine, but now of Chelsea, of the State of Massachusetts, have invented a new and useful improvement in Washing-Machines; and do hereby declare the same to be fully represented in the accompanying drawing, and to be described as follows:

Of such drawing—

Figure 1 is a top view;

Figure 2, a side elevation of the dasher; and

Figure 3 is a transverse section of my improved washing-machine.

In such drawing—

A denotes a perforated disk, having not only a round shaft, B, projecting upward from its center, but a series of prismatic arms or slats C C, &c., arranged on its top, and extended therefrom and formed in manner as shown.

The perforations of the disk are exhibited at *a a* as arranged between the arms, and near their junctions.

It will be observed that each arm is at right angles to two others, and extends beyond them in opposite directions, one end of the arm terminating at or close to the periphery of the disk, while the opposite end of the arm is placed at a distance of about half the length of the arm from the next adjacent part of the periphery.

This arrangement of the arms and the disk is very useful, as in practice the arms so disposed will operate so as to aid in preventing the clothes in the tub of the dasher from being moved toward and piled about the shaft, as the centrifugal force generated in the water, and tending to throw it upward at the sides of the tub, will be met and counteracted by lateral currents or forces induced in the water by the arms.

From the series of arms there is extended upward, to a disk or circular head, D, arranged on the shaft, as represented, a series of round bars, E E E, they being arranged at equal, or about equal, distances apart. Their purpose is to aid in washing the clothes, and imparting to them reciprocating rotary motions within the tub G, within which the dasher is arranged, and to which it is pivoted, so as to be capable of being moved therein with a reciprocating rotary movement by a person when hold of the handles *a' a'* of a lever, H, placed upon the upper prismatic part of the dasher-shaft.

The said shaft has a bearing in a cross-bar, I, whose opposite ends are inserted in socket-pieces K L, projecting upward from the upper part of the tub.

One of the socket-pieces, (viz., K,) is provided with a port or passage, *b*, leading out of its socket laterally, but having a depth less than that of the socket, the same being as shown in Figure 4, which is a front view, and in Figure 5, which is a side view, and in Figure 6, which is a horizontal section of the socket-piece, the socket being shown at *c*.

The other socket-piece, L, has simply a round recess or socket, *c'*, made in it to receive the end of the cross-bar.

The distance between the bottoms of the two sockets, when attached to the tub, is to be equal, if not a little greater than the length of the bar I, but the distance from the bottom of the entrance passage *b* to the bottom of the socket of the opposite socket-piece is to be somewhat less than the length of the bar I, the whole being to enable the said bar, after having one end inserted in the socket *c'* of the last-mentioned socket-piece, to have its other end passed through the passage *b*, and sprung into the socket of the other socket-piece, the inherent elasticity of the tub and the bar enabling such to be effected. This mode of applying the bar to the tub admits of their being easily separated when occasion may require.

The advantages of having the perforation of the disk arranged close about the shaft is, that they enable the water to operate to better advantage by centrifugal force, to prevent deposits of dirt and extraneous matters beneath the disk.

One or more holes, *a*, may be made laterally through each arm near its outer end.

I therefore claim as my improvement in a washing-machine—

The disk A, with its holes *a a*, arms *c*, and the series of bars E, combined and arranged relatively to each other, and with the shaft B, as and to operate in the tub in the manner as explained and represented, the disk and arms under such arrangement being extended horizontally beyond the series of bars E, and combined therewith, so as to revolve with them in one and the same direction, all as shown and described.

RUSSELL S. MORSE.

Witnesses:

R. H. EDDY,

J. R. SNOW.

J. W. Groat,

2 Sheets, Sheet 1.

Masting Mach.

No. 113,762. Patented Apr. 18. 1871.

Fig. 1

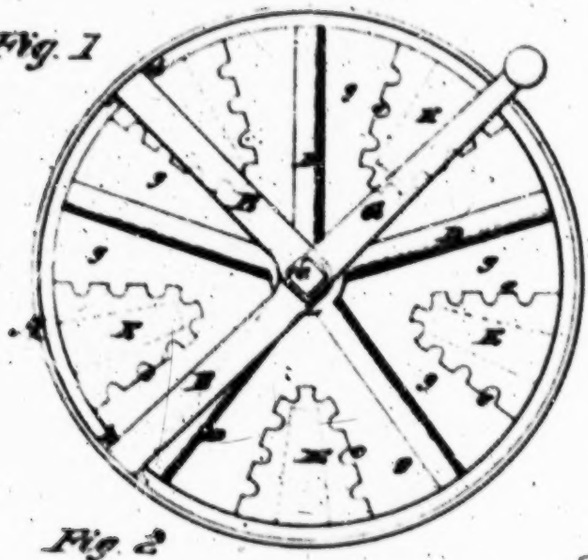


Fig. 2

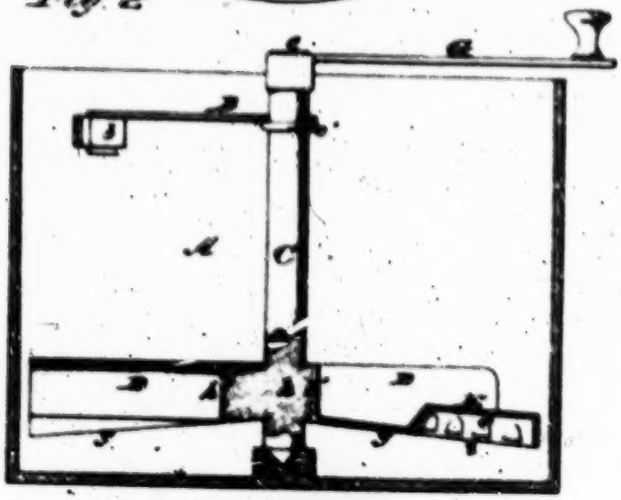
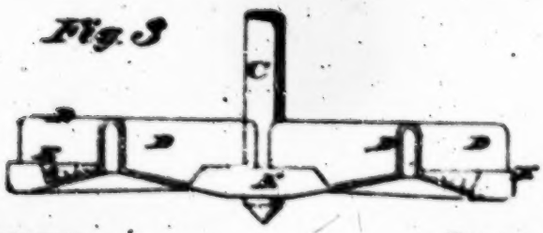


Fig. 3



Witnesses
R. T. Campbell
J. W. Campbell

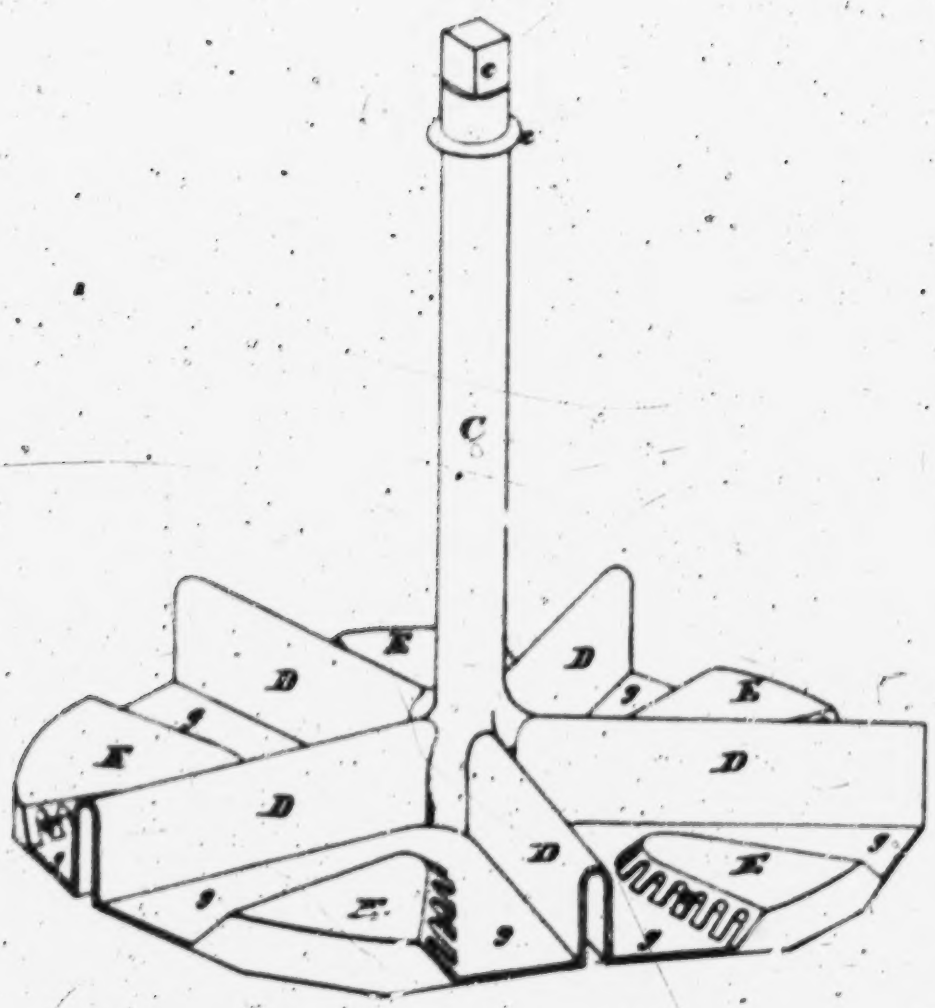
Inventor
J. W. Groat
by
Munn & Co

2 Sheets Sheet 2.

J. W. Grout,

Washing Mach.

No. 113,762. Patented Apr. 18. 1871.



Witnesses
C. D. Longfellow
John Campion

Inventor
J. W. Grout
by
Munn & Howard Attorneys

United States Patent Office.

JULIUS W. GROAT, OF FREMONT, OHIO.

Letters Patent No. 113,762, dated April 18, 1871.

IMPROVEMENT IN WASHING-MACHINES.

The Schedule referred to in these Letters Patent and making part of the same.

all whom it may concern:

e it known that I, JULIUS W. GROAT, of Fre-t, in the county of Sandusky and State of Ohio, e invented a new and improved Washing-Ma-e; and I do hereby declare that the following is a , clear, and exact description thereof, reference be-had to the accompanying drawing making part of specification, in which—

igure 1, plate 1, is a top view of the machine plete.

igure 2, plate 1, is a diametrical section through machine.

igure 3, plate 1, is an edge view of the rotary shing-wheel.

igure 4, plate 2, is a perspective view of the wash-wheel and its shaft.

milar letters of reference indicate corresponding ts in the several figures.

his invention relates to improvements on wash-machines which have horizontal ribbed or flange-webs arranged in the bottoms of the vessels which tain the articles while being cleansed.

he washing is performed with such machines by revolution of their wheels and the rubbing of ribs and the dashing of the water against the ribs.

he nature of my invention consists—

irst, in a washing-wheel which is applied to a ver-l shaft, and which is composed of radial arched s open at the bottom, and connected together by ir inclined webs or feathers which have openings ough them for allowing water to be dashed up-d through the wheel against the articles being ashed.

econd, in the combination of raised covers of rds having grated or perforated sides with the forated inclined webs between the radial arms, as be hereinafter explained.

o enable others skilled in the art to understand invention, I will describe its construction and ration.

n the accompanying drawing—

A represents a wash-boiler, which may be made of desired capacity and suitably strengthened.

his boiler is cylindrical, and in the center of its ttom is a raised step, *a*, for receiving the conical end vertical shaft, C.

ear the upper end of the boiler A, and fastened inside, are two flat staples, *b b*, which receive bent ends of a horizontal triangular support, B, ich sustains the shaft C near its upper end, and, ough it an annular rib, *c*, on this shaft, keeps it d in place while the machine is in operation.

The triangle B is removable, and is slipped out of its staples *b b* when it is desired to remove the shaft C and its wheel.

The upper end *e* of shaft C is prismatic, and receives the end of a handle, G, by which the shaft is rotated or oscillated.

On the shaft C is formed a hub, *h*, from which radiate arms *h' h'*, corresponding in number to the number of arched ribs which are formed on the washing-wheel.

The upper surfaces of the arms *h'* are rounded, to correspond to the rounded or arched form of the ribs on said wheel.

The washing is executed by means of a wheel of peculiar construction, which is preferably made of metal, galvanized to prevent rust, and which is secured, by its hollow radial arched ribs D to the radial arms *h'* of the hub *h* on the vertical shaft C.

The attachments of the wheel to its arms *h'* may be effected by means of rivets or solder, or by both combined.

The wheel consists of a number of raised radial arches, ribs, or beaters, D, having open bottoms and closed arched tops, and rising from webs *g*, which are respectively inclined in opposite directions, and perforated at *i* (see fig. 2) for the free escape of water from below above the webs, where it will be acted by the ribs D and dashed among the clothes.

The openings *i* are in the middle of the spaces between the ribs D, and the webs incline in two directions toward each opening.

To prevent the articles which are being washed from passing through or closing the openings *i*, I arrange a guard, E, over each one of these openings, the sides *e* of which guard are inclined or perforated to allow a free circulation of water through the openings.

It will be seen from the above description, when taken in connection with the annexed drawing, that, when articles to be cleansed are put into the boiler or vessel A upon the wheel, with soap and water, and the wheel is turned back and forth about its axis, the inclined webs *g* will cause water below the wheel to dash up through the openings *i*, where the currents will be struck by the ribs D and dashed against and through the articles; at the same time the ribs D will operate to rub and turn the articles and agitate the water violently above the wheel.

Not only do I obtain an advantage by my improved construction of washing-wheel over others for the same purpose in its operation upon the articles being washed and the agitation of the water in the vessel, but I also obtain an advantage in the con-

struction of the wheel, in that it is very light and very strong and durable, and can be readily manufactured out of sheet metal at a small cost.

Having described my invention,

What I claim as new, and desire to secure by Letters Patent, is—

1. The washing-wheel, constructed with radial arched open-bottom ribs or beaters D and inclined perforated webs *g*, substantially as described.

2. The covers or guards E, having perforated sides *e*, and applied over openings *i i* between the radial ribs or beaters D, substantially as and for the purposes described.

JULIUS W. GROAT.

Witnesses:
J. R. BARTLETT,
FRANK BRAYTON.

J. RUNKLE.

Improvement in Washers and Boilers Combined.

No. 131,629. Patented Sep. 24, 1872.

Fig. 1.

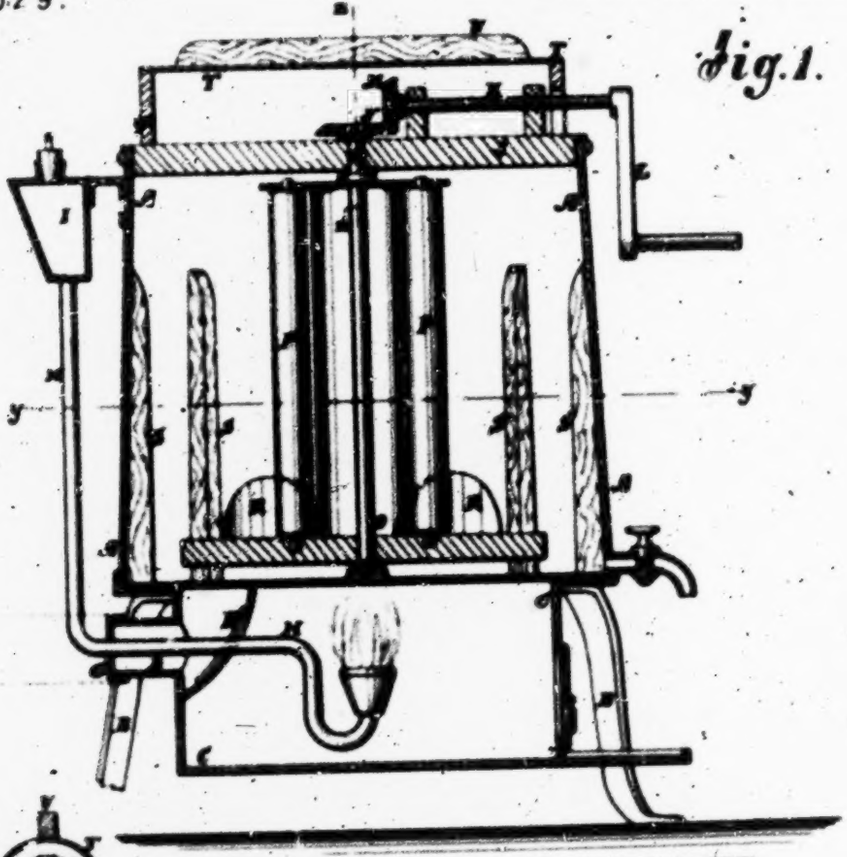


Fig. 3.

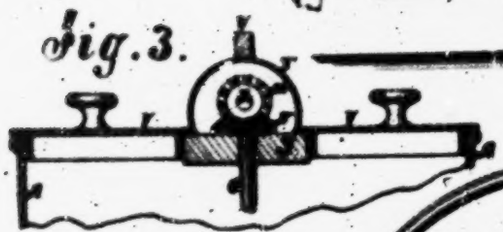
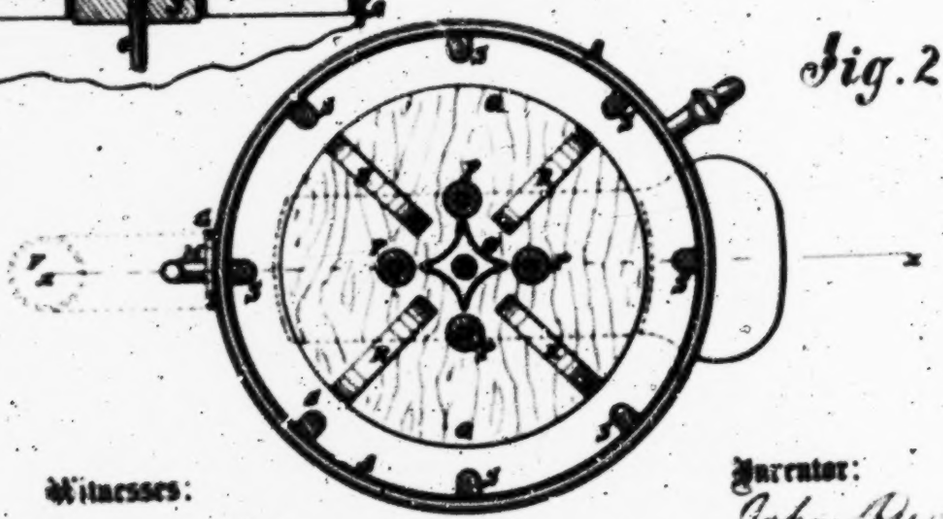


Fig. 2.



Witnesses:

A Bennewendorf.

A. Seligmann

Inventor:

John Runkle

Per Munn & Co.

Attorneys.

UNITED STATES PATENT OFFICE.

JOHN RUNKLE, OF READING, PENNSYLVANIA.

IMPROVEMENT IN WASHERS AND BOILERS COMBINED.

Specification forming part of Letters Patent No. 131,690, dated September 24, 1872.

To all whom it may concern:

Be it known that I, JOHN RUNKLE, of Reading, in the county of Berks and State of Pennsylvania, have invented a new and useful Improvement in Combined Clothes Boiler and Washer, of which the following is a specification:

Figure 1 is a detail vertical section of my improved machine taken through the line *x x*, Fig. 2. Fig. 2 is a detail horizontal section of the same taken through the line *y y*, Fig. 1. Fig. 3 is a detail section taken through the line *z z*, Fig. 1.

Similar letters of reference indicate corresponding parts.

My invention has for its object to furnish an improved machine by means of which the clothes may be boiled and washed at the same time, and which shall be simple in construction, convenient in use, and effective in operation, washing the clothes quickly, thoroughly, and without injuring them; and it consists in the construction and combination of various parts of the machine, as hereinafter more fully described.

A represents a cylindrical vessel supported upon legs B of such a length as to raise the vessel A to such a height that a furnace, C, may be placed beneath it. The furnace C is an ordinary coal or wood furnace, and is made with a plate upon or surrounding its top, which should be concaved or recessed upon its upper side to allow the products of combustion to come in contact with a larger part of the bottom of the cylinder A before escaping through the flue D. The edge of the projecting top-plate of the furnace C is secured to the edges of the bottom of the cylinder A by lugs and keys, or by other convenient means. The egress-opening from the furnace C is provided with a damper, E, to enable the draft to be regulated at will. When coal or wood is used a pipe, F, is connected with the outer end of the flue D. When kerosene or other liquid fuel is to be used the pipe F is detached and a cap, G, placed over the outer end of the flue D. In the cap G is formed a hole for the passage of the pipe H, the inner part of which passes through the flue D into the furnace C, and is provided with holes or burners for the effective combustion of the liquid. The outer part of the pipe H passes up along the side of the cylinder A, and its upper end is connected with a reservoir, I, to contain the oil. To the top edges of the vessel A is attached a cross-bar, J, to which are attached bearings for the horizontal shaft K, to the outer end of which is attached a crank, L, for operating the machine. To the inner end of the shaft K is attached a bevel-gear wheel, M, the teeth of which mesh into the teeth of the bevel-gear wheel N attached to the upper end of the shaft O, which passes down through and revolves in bearings in the center of the cross-bar J, and its lower end revolves in a step or socket in the center of the bottom of the vessel A. The body of the shaft O is made square in its general form and with concave sides, as shown in Fig. 2. P are four rollers, one of which is placed opposite each of the corners of the shaft O, and the upper ends of which are pivoted to a plate or spider attached to the upper end of the body of the shaft O. The lower ends of the rollers P are pivoted to the circular plate Q attached to the lower end of the body of the shaft O, so as to be carried around by and with said shaft in its revolution. The circular plate Q is made smaller than the interior of the vessel A; and to its upper side are attached rounded projections, R, which act upon the water and clothes to throw them into violent commotion. To the inner surface of the sides of the vessel A are attached vertical ribs S, which operate, in connection with the projections R and rollers P, to throw the water and clothes into violent agitation and clean the clothes in a very short time. The cross-bar J and gearing K M N are covered with a cap or casing, T, which is provided with an upwardly-projecting flange, U, to which a wringer may be attached. The top of the vessel A, at the sides of the cross-bar J, is covered with segmental covers V, to prevent the water and steam from escaping while the machine is being used.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. The concaved shaft O, rollers P, and rounded projections R, in combination with

Page Tightly Bound

the circular plate Q and vessel A, substantially as herein shown and described, and for the purpose set forth.

2. The combination of a furnace, C, whether arranged for solid or liquid fuel, or for both, with the vessel A, provided with the apparatus O P Q R S, substantially as herein shown and described, and for the purpose forth.

JOHN RUNKL

Witnesses:
MATTHIAS MENGEL,
H. C. HIESTER.

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(Model.) 3 Sheets—Sheet 1.

J. G. CRAWFORD.

WASHING MACHINE.

No. 266,975. Patented Nov. 7, 1882.

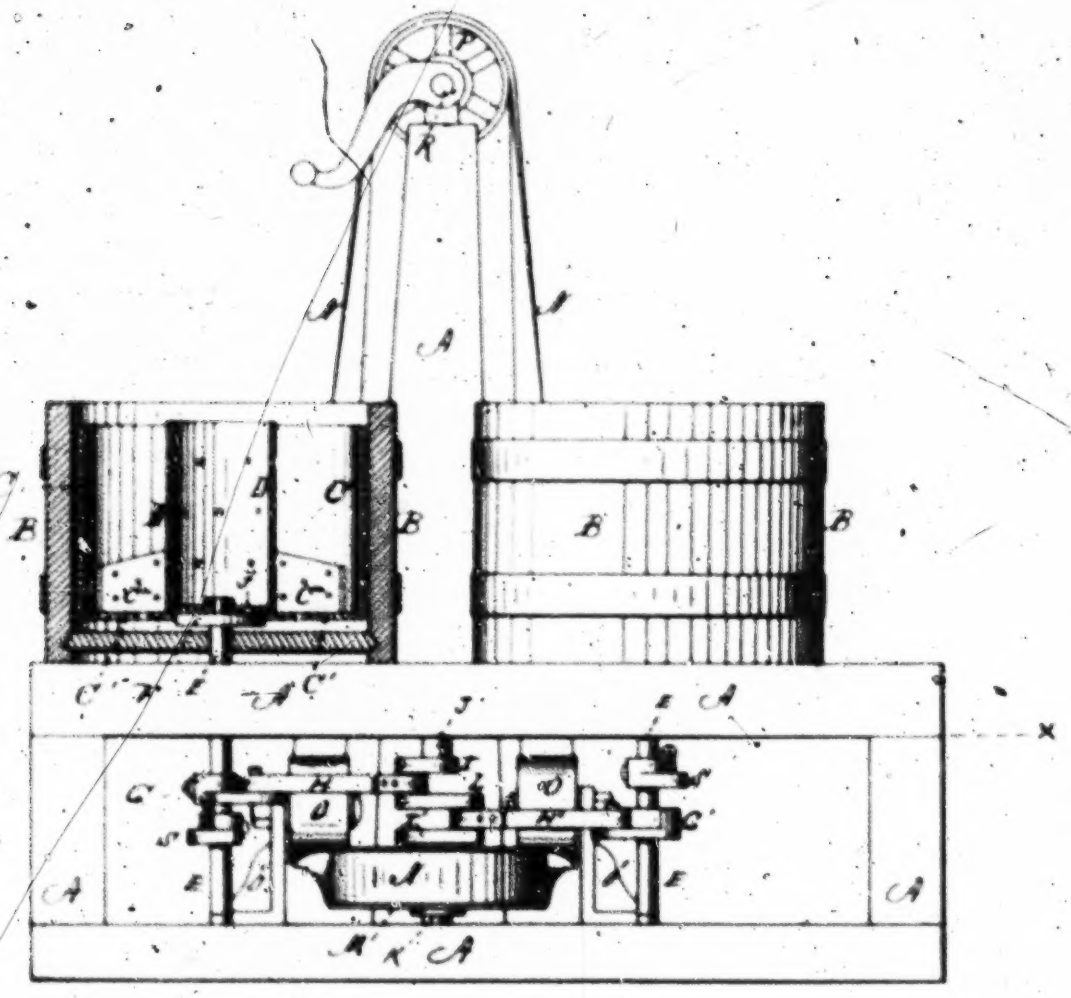


Fig. 1.

WITNESSES

Joseph Oshbaugh

E. W. Williams.

INVENTOR

James G. Crawford.

By his Atty.

Henry W. Williams

875

(Model.) 3 Sheets—Sheet 2.

J. G. CRAWFORD.

WASHING MACHINE.

No. 266,975. Patented Nov. 7, 1882.

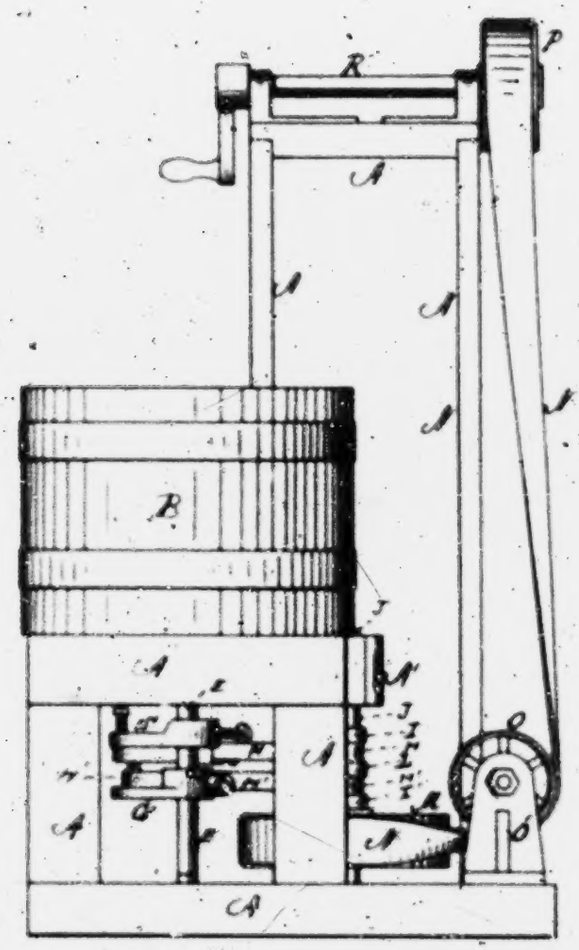


Fig. 2.

WITNESSES

Joseph Eshbaugh

B. W. Williams

INVENTOR

James G. Crawford

By his Atty

Henry W. Williams

(Model.)

3 Sheets—Sheet 3.

J. G. CRAWFORD.

WASHING MACHINE.

No. 266,975. Patented Nov. 7, 1882.

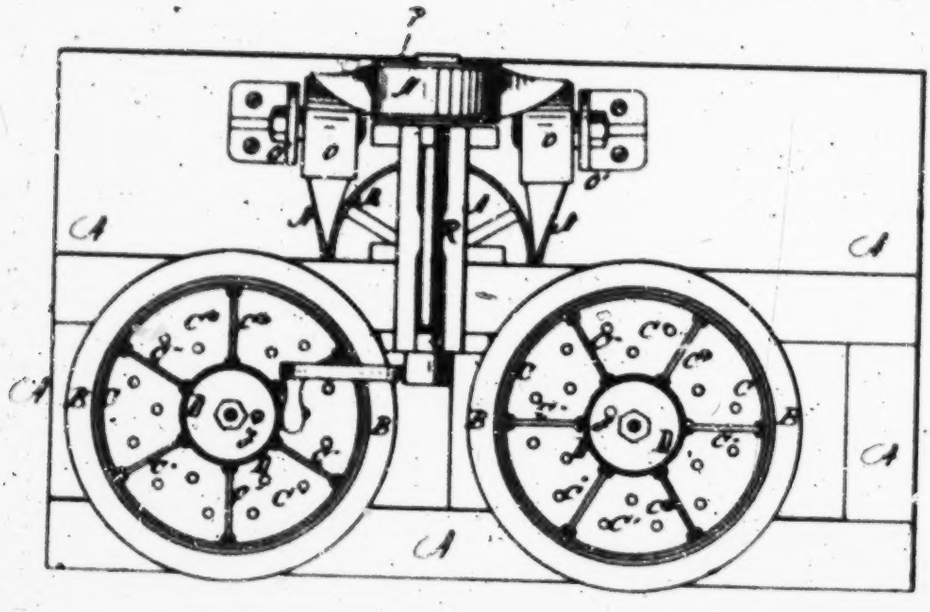


Fig. 3.

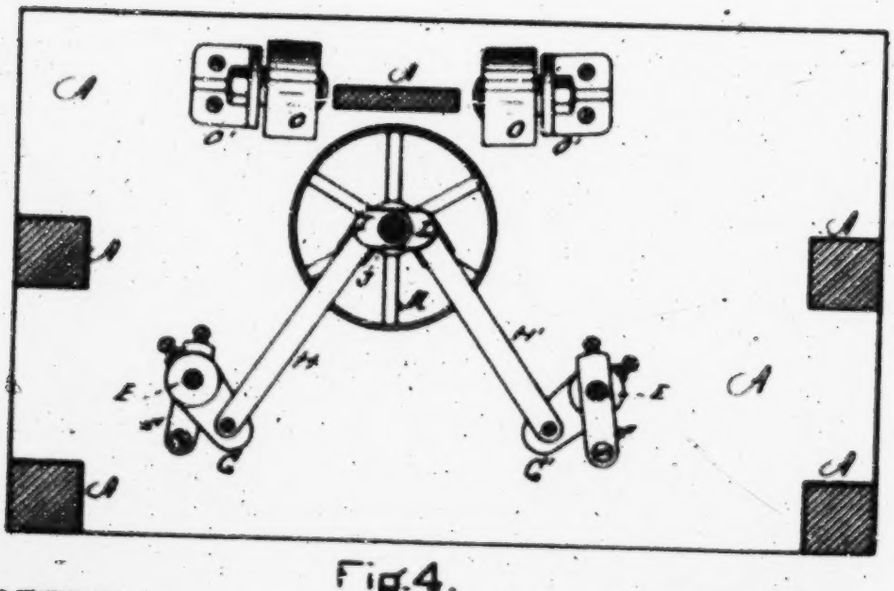


Fig. 4.

WITNESSES

Joseph Sellaugh

B. W. Williams

INVENTOR

James G. Crawford,

By his Atty

Henry C. Williams

878

UNITED STATES PATENT OFFICE.

JAMES G. CRAWFORD, OF BOSTON, MASSACHUSETTS.

WASHING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 266,975, dated November 7, 1882.

Application filed April 12, 1882. (Model.)

To all whom it may concern:

Be it known that I, JAMES G. CRAWFORD, of Boston, in the county of Suffolk and State of Massachusetts, have invented new and useful Improvements in Washing-Machines, of which the following is a specification.

This invention relates to that class of washing machines adapted for use in laundries, hotels, public institutions, and like places.

In the accompanying drawings, in which similar letters of reference indicate like parts, Figure 1 is a front elevation of a washing-machine embodying my improvements, one of the tubs being shown in vertical section. Fig. 2 is an end elevation of the same. Fig. 3 is a plan view. Fig. 4 is a horizontal section on line *x x*, Fig. 1.

A is a frame, upon which are rigidly placed one or more tubs, B, similar in construction throughout. Within these tubs are inner tubs or "baskets," C, for holding the clothes to be washed. These baskets C are provided with perforated bottoms C′ and perforated agitators or partitions C″, rigidly secured to the baskets, as shown. Thus far there is nothing novel. The water having been poured into the tubs or baskets, reciprocating rotary motion is applied to the baskets C, for the purpose of agitating the contents, and thus washing the clothes, by means of mechanism below described. When the baskets are constructed as is now common—*i. e.*, with the agitators only—the action of the water, caused by the combined forces of rotary movement, reversing, and gravitation, is such that the clothes are thrown in toward the center of the basket and twisted together in a very complicated manner. The water seems first to be moved toward and up the sides of the basket by centrifugal force, and then, when the basket reverses, in seeking its level, it is thrown violently inward with a twisting motion, which results in tangling and twisting the clothes at the center of the tub in an intricate manner. The principal evils connected with this twisting or tangling are, that it takes much time to untwist the garments to remove them, and after removal, and that it is difficult for the water to penetrate and cleanse them while they are knotted together in the center of the basket C. In order to remedy this evil, I have provided in this improvement the central annular guard or tube, D, rigidly secured at its base to the basket C, suitably perforated, and extending nearly or quite as high as the top of the basket. As the water dashes violently inward it is checked by this guard D, (within which the water is quiet, there being no agitators nor clothes therein,) and the clothes are thereby prevented from being thrown to the center of the basket, and no tangling, nor even twisting, results. On the contrary, they slip off from the guard as they are thrown against it without any knotting whatever, the clothes from opposite sides not impinging against each other, as formerly.

Rotary reciprocating motion is imparted to the baskets C as follows: The vertical shafts E are secured, by means of the disks F and pins *f*, to the bottom C′ of the baskets. These shafts E, which have their bearings at their lower ends in the base of the frame A, have fixed to them the cranks G G′, which are, by means of the rods or links H H′, swiveled to said cranks, connected with the cranks I I′ loosely, said cranks being fixed to the vertical shafts J K, respectively, and connected by the swiveled link L in order to overcome the dead-point. The shaft J has its bearing in the part A′ (see Fig. 2) of the frame A, and the shaft K has its bearing in the base of the frame and carries the large pulley M, which acts as a balance-wheel. A belt, N, passes around the pulley M and the small pulleys O O to the pulley P on the shaft R, to which power is applied. The small pulleys O O have bearings in brackets O′ O′, supported by the base of the frame A. By means of studs S other tubs may be connected.

Having thus fully described my invention, what I claim, and desire to secure by Letters Patent, is—

In a washing-machine, the combination, with the reciprocating rotary tub or basket C, constructed substantially as described, of the central annular guard or tube, D, secured in said tub or basket, substantially as and for the purpose set forth.

JAMES G. CRAWFORD.

Witnesses:
HENRY W. WILLIAMS,
JOSEPH ISHBAUGH.

(No Model.) 2 Sheets—Sheet 1.

C. & J. W. MEARS.

WASHING MACHINE.

No. 443,778. Patented Dec. 30, 1890.

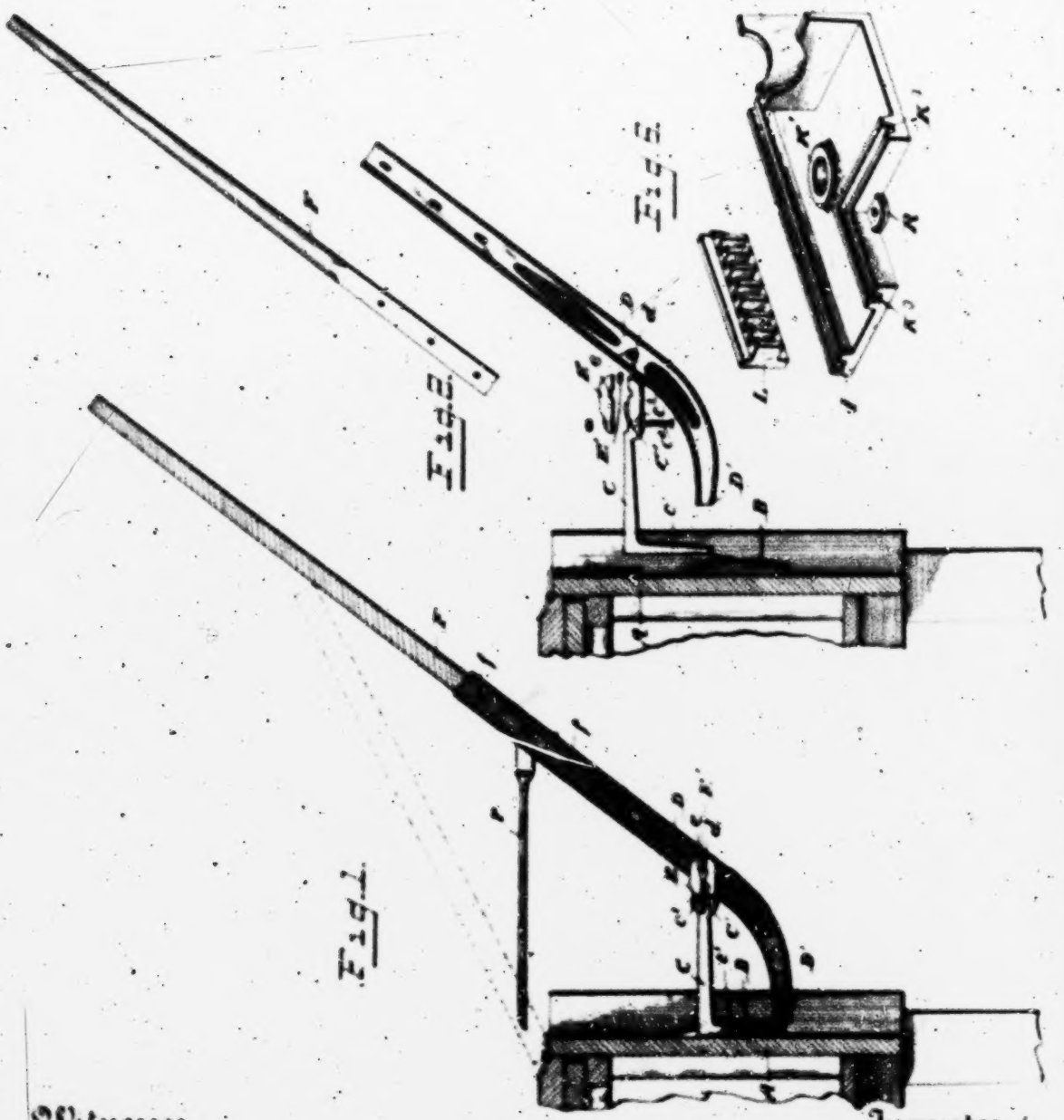


Fig. 1.

Witnesses
Edwin L. Bradford
H. L. Boyden

Inventors,
Camden Mears and
John W. Mears
By their Attorney-in-fact
Rod. B. Barber.

(No Model.) 2 Sheets—Sheet 2.

C. & J. W. MEARS.

WASHING MACHINE.

No. 443,778. Patented Dec. 30, 1890.

Fig. 4.

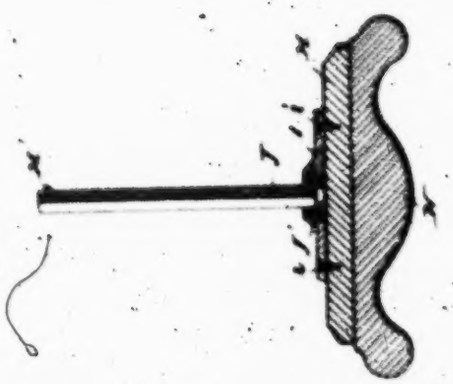
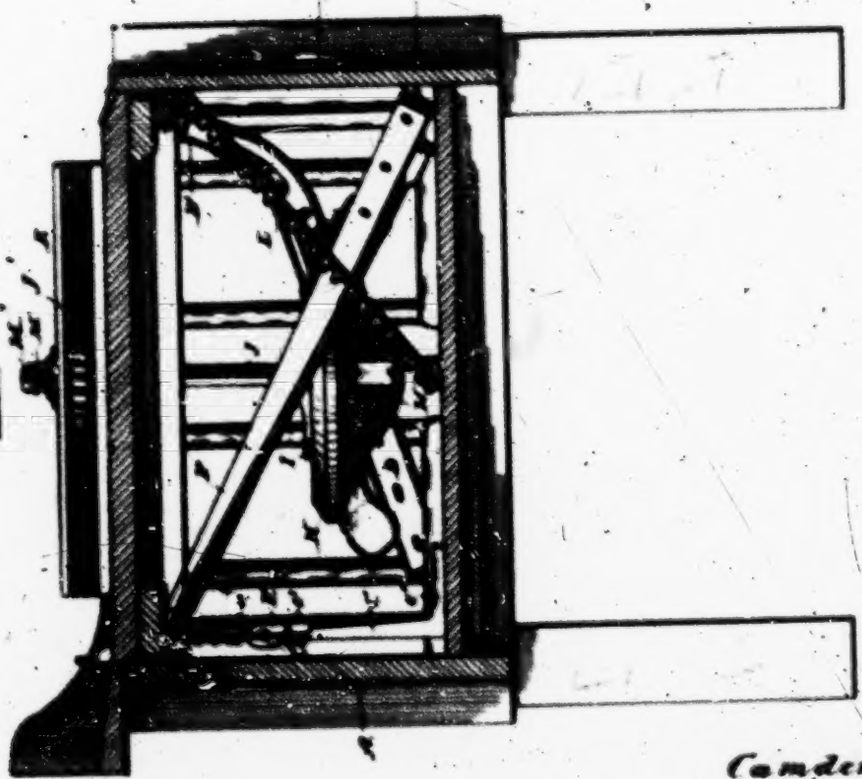


Fig. 5.

Fig. 3.



Witnesses
Edmund L. Bradford
H. L. Boyden

Camden Mears
and John W. Mears
Inventors
Chas. E. Foster
By their Attorney in fact.

UNITED STATES PATENT OFFICE.

CAMDEN MEARS AND JOHN W. MEARS, OF BLOOMSBURG, PENNSYLVANIA.

WASHING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 443,778, dated December 30, 1890.

Application filed June 28, 1887. Serial No. 242,753. (No model.)

To all whom it may concern:

Be it known that we, CAMDEN MEARS and JOHN W. MEARS, citizens of the United States, residing at Bloomsburg, in the county of Columbia and State of Pennsylvania, have invented certain new and useful Improvements in Washing-Machines, of which the following is so full, clear, and exact a description as will enable others skilled in the art to which our invention appertains to make and use the same, reference being had to the accompanying drawings, in which—

Figure 1 is a longitudinal vertical section of our improved handle and the supports and other appurtenances for use therewith. Fig. 2 is a side elevation of the same, showing the various parts detached. Fig. 3 is a vertical section of our improved washing-machine, showing the detachable parts separated and put inside of the washing-machine. Fig. 4 is a detail view of the rubber and a ball-and-socket joint for use therewith. Fig. 5 is a detail view of two reversible plates. Fig. 6 is a perspective view of one of the reversible plates with the toothed rack shown in position slightly above the same.

The objects generally of our invention are to provide a washing-machine which will be simple and effective in its construction and operation and one which will be so cheap as to be within the reach of the masses. These objects are accomplished in the manner hereinafter described; and the invention consists in the construction, combination, and arrangement of parts, as will be hereinafter pointed out in the appended claims.

The main body of the washer is designated by the letter A, to one side of which is secured the socket B, which is adapted to receive the bracket C, which is provided with the downwardly projecting end c', adapted to slip in and out of the socket B. The outer portion of the bracket C is provided with a depression C', beyond which is a semicircular depression, which forms a journal-bearing for the trunnion d on the skeleton handle D. The outer portion of the bracket C is also perforated at c^2 to receive a bolt c^3, which is adapted to secure a removable plate E, also provided with a semicircular depression e, which completes a journal-box for the trunnion or journal bearing d on the skeleton handle D. This trunnion or journal bearing d on the handle D is of a greater diameter than the journal box or bearing formed by the coupling of the removable plate E and the outer portion of the bracket C. The object of this is to allow the adjustment of the movable plate toward the stationary plate or bracket C to compensate for the wear at this point.

E' designates a piece of pasteboard or a thin strip of wood or any other equivalent which may be used to keep the plate E and the outer portion of the bracket C slightly apart until after the trunnion has become sufficiently worn to cause it to run smooth and without friction.

The upper portion of the skeleton handle D is perforated to receive bolts $f\,f$, which are adapted to extend through the wooden handle F and the perforations in the skeleton handle. The lower end of the skeleton handle is provided with a projecting end D', which is adapted to abut against the socket B when the washing-machine is open and its cover tilted up and back, as shown in dotted lines in Fig. 1, wherein the bracket C acts as a fulcrum and the handle as a lever to support said cover.

The automatically self-adjusting head H is provided with a removable plate I, secured thereto by screws i, and which is perforated centrally and adapted to receive the angular rod J, upon the lower end of which is an enlarged portion or head J'. The opening through the plate I is slightly larger than the rod which extends through it, which allows the rotating head to rock on the end of the rod; but said opening is angular in form to cause the rotation of said plate I when the rod J is revolved. This construction admirably adapts the rubber H to adjust itself to the clothing, whether they be evenly distributed through the washer or whether the greater portion be near one side of the washer, all of which will be readily understood and appreciated.

The rod J slides vertically through a master-wheel J' in the top of the machine, as has been fully explained in our application, Serial No. 218,609, filed on the 11th day of No-

vember, 1886, for an improvement in washing-machines, and upon which this invention is designed as an improvement.

By reference to the other application referred to, the operation of the other parts of the machine will be clearly and distinctly understood.

The plates K K are to be used on the top of the machine to hold the gear-wheel and its rack-bar in place, and they are made reversible and interchangeable to compensate for wear, and may be reversed when it is found desirable. These plates are precisely identical in shape, size, and construction, so a description of one will suffice for both. The central raised boss K' of the lower plate supports the weight of the gear-wheel J', and the rod J passes through the hole therein. The webs K² of one plate fit into the corresponding grooves K³ of the other when one is placed above the other, and screws or bolts are passed through the perforated ears R into the body of the machine for holding the plates in place. Along one side of the plates K is a pair of registering grooves *l*, within which the toothed rack L reciprocates, the teeth thereof intermeshing with the teeth of the wheel J', as will be clearly understood without a more explicit description.

The movable rubber or head H is provided with rounded extensions at its outer edge which extend beyond the edge of the head proper, and it is provided with a bulb or curved extension in its center, which admirably adapts it for use as an agitator to clothing, the central portion or projection N serving to stir the clothing beneath the center of the rubber.

From the foregoing it will be readily understood that a machine constructed after this description will be light and will be one which may be easily operated. Parts may be readily taken apart and put together, and when taken apart may be placed inside the washer to be shipped from point to point, and the machine, by reason of its various advantages and improvements, will meet a popular demand which is everywhere felt, and will be a great labor-saving device wherever it is used.

The upper end of the rod J, which supports the rubber, is provided with a coil-spring M, surrounding it and held thereon beneath the pin M' for supporting said rod and head, and which will deaden the shock on the cover and to the machine and head when the cover is closed and the head drops down into the washer. A bracket C being placed in position in the socket B and the handle D F pivoted thereto in the manner above described, a pitman-rod P is connected at its ends to said handle and to the rack-bar L, and when the handle is reciprocated said rack-bar L is moved backward and forward against the wheel J' on the bar J, whereby the latter is revolved in a manner which will be well understood without further explanation.

Having now described the objects, uses, and advantages and having set forth a preferred means of constructing our devive, what we desire to secure by Letters Patent and what we therefore claim is—

The bracket C, having cut-away portions C' at its outer upper end and a transverse semicircular groove therein, and the plate E, having a registering semicircular groove *e* in its lower face, in combination with a handle D, having a laterally-projecting trunnion *d*, a bolt *e'* for clamping said plate E upon said bracket to form a bearing for said trunnion, and a block E' for keeping the outer ends of said bracket and plate slightly separated, as and for the purposes specified.

In testimony whereof we affix our signatures in presence of two witnesses.

CAMDEN MEARS.
JOHN W. MEARS.

Witnesses to the signature of Camden Mears:

VINTON COOMBS.
CHAS. J. STOCKMAN.

Witnesses to the signature of John W. Mears:

G. M. QUICK,
A. N. YOST.

883

(No Model.) 2 Sheets—Sheet 1.

A. G. CHRISTMAN.

WASHING MACHINE.

No. 444,421. Patented Jan. 13, 1891.

FIG. 1.

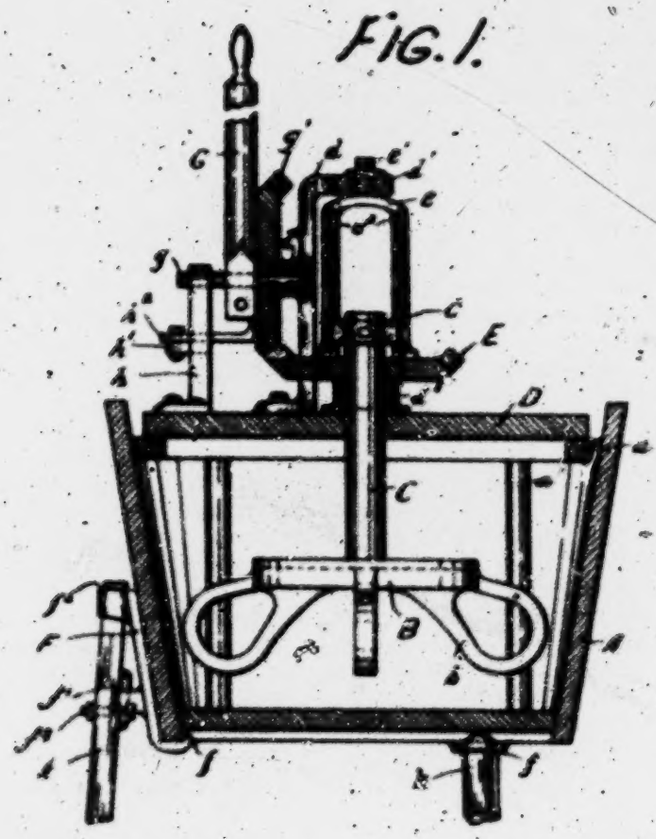


FIG. 2.

WITNESSES

Augustus G. Christman

INVENTOR

A. Torrey

881

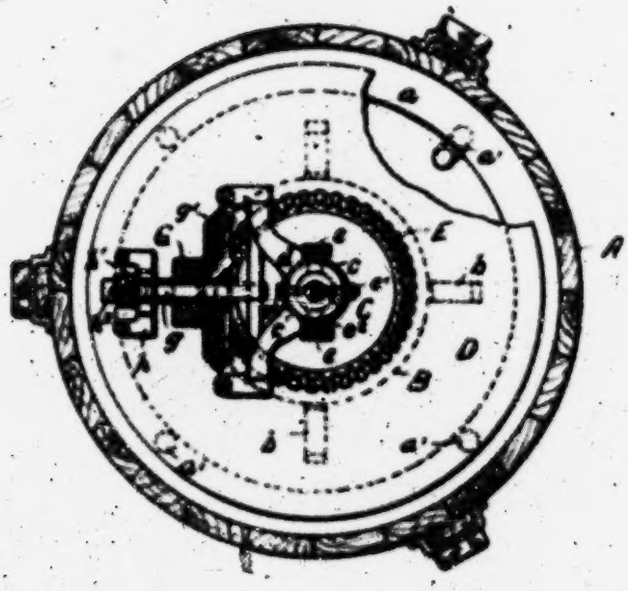
(No Model.) 2 Sheets—Sheet 2.

A. G. CHRISTMAN.

WASHING MACHINE.

No. 444,421. Patented Jan. 13, 1891.

FIG. 3.



Witnesses
Chas. Dueas.

Alexander G. Christman Inventor
By his Attorney

UNITED STATES PATENT OFFICE.

AUGUSTUS G. CHRISTMAN, OF READING, PENNSYLVANIA.

WASHING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 444,421, dated January 13, 1891.

Application filed September 23, 1889. Serial No. 324,721. (No model.)

To all whom it may concern:

Be it known that I, AUGUSTUS G. CHRISTMAN, a citizen of the United States, residing at Reading, in the county of Berks and State of Pennsylvania, have invented certain new and useful Improvements in Washing-Machines; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates particularly to vertical washing-machines having rotary agitators.

The main feature consists in the peculiar operating mechanism employed, whereby the body of the agitator-shaft is adapted to readily slide up and down in the machine-cover to accommodate different quantities of clothing in the tub without at all interfering with the rotation of the agitator or producing undesirable clatter and lost motion. This and other features of the invention are fully described herein.

Figure 1 is a sectional elevation of a washing-machine embodying my invention. Fig. 2 is a sectional plan view of the cross-head end of the agitator-shaft. Fig. 3 is a plan view of the machine partly in section.

The tub A is preferably circular in form, and is provided with posts a', extending from the bottom of the tub to the top flange a, on which the cover D rests. They are some distance away from the wall of the tub, yet arranged to clear the pear-shaped wings b of the agitator B, which wings extend below and outward from a central disk and have openings corresponding in shape with the general outline of the wings. The agitator, as well as its shaft C, is preferably constructed of wood, in order to avoid the use of metal in direct contact with the contents of the machine when in operation, and the shaft, which is preferably of uniform circular section throughout its length, passes upward through the cover D and a bevel-wheel E, and has clamped to its upper end, by means of bolts c^2, which pass through the shaft, bars $c\,c$, which thus form a cross-head on the end of the shaft, the slots c' of which engage guides e^2, projecting inwardly from the vertical faces of a yoke e, which yoke forms a part of the wheel E and rotates with it. The hub of the wheel E is loose on the shaft C and is supported in a bearing d^2, secured to the top of the cover D. The upper end of the yoke e is provided with a journal e', which passes through a bearing d' of a standard d, secured to the cover. This same standard is also provided with a bearing d^2, which supports one end of a right-angular shaft g, to which are secured the operating-lever G and bevel-wheel g'. The other end of this shaft passes through a separate standard h. In order to maintain the bevel-wheels in proper gear, a stop-piece h^2 is adjustably secured to a shelf h' of the standard h, and is used to set the wheel g' to its proper position. Heretofore stop-pieces have been provided for this purpose; but they have been secured to the wooden cover of the tub instead of to a special shelf provided on the standard. The advantage of my construction is that the stop-piece is when adjusted practically solid with the bearing for the shaft in which the wheel is supported, and is also more satisfactorily adjusted and firmly secured.

I am aware that it is not new to provide a rotary agitator which is capable of axial movement, and I do not broadly claim such a construction, though I do not, on the other hand, limit myself to the exact construction herein described, my invention being specifically set forth in the following claims.

What I claim is—

1. In a washing-machine, the combination, with the cover and the agitator-shaft provided with a cross-head c, of bevel-wheel E, having guide-yoke extension e, with top journal e', standard d, with bearings d' and d^2, bevel-wheel g', and operating-lever on a shaft g and standard h, with adjustable stop h^2, all substantially as set forth.

2. In a washing-machine, the vertically-movable rotary scrubber-shaft passing loosely

through the cover and through a gear-wheel supported thereon and guided vertically by and also rotated within an extension *e* of said wheel, substantially as described, in combination with a lever mechanism for rotating said gear-wheel, and a top bearing for said extension, all substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

AUGUSTUS G. CHRISTMAN.

Witnesses:
W. G. STEWART.
ED. A. KELLY.

No. 832,787. PATENTED OCT. 9, 1906.

W. C. FOSTER & L. E. GARRISON.

WASHING MACHINE.

APPLICATION FILED JUNE 19, 1906.

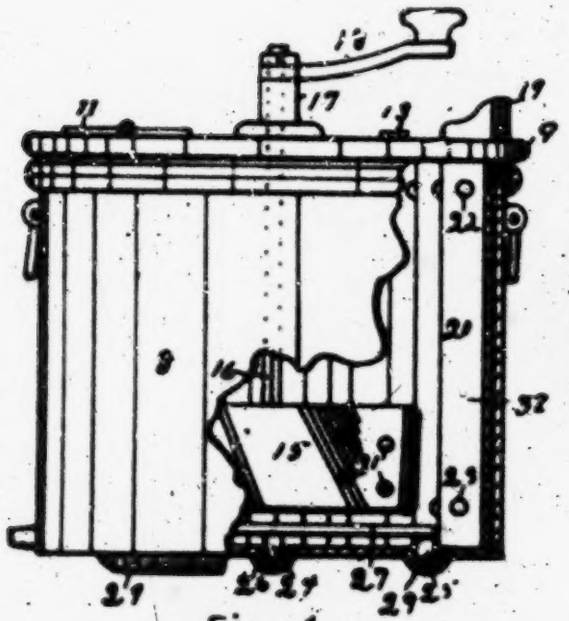


Fig. 1.

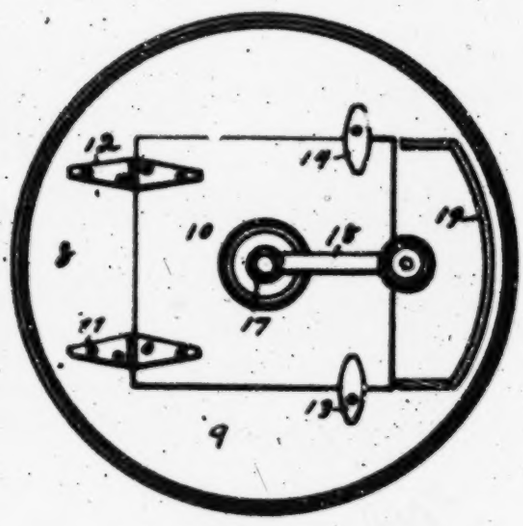


Fig. 2.

Fig. 3.

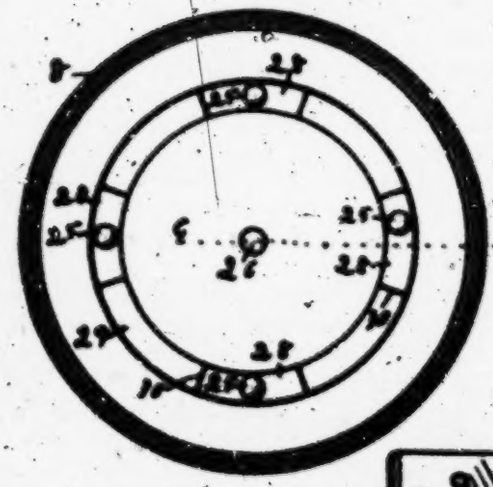


Fig. 4.

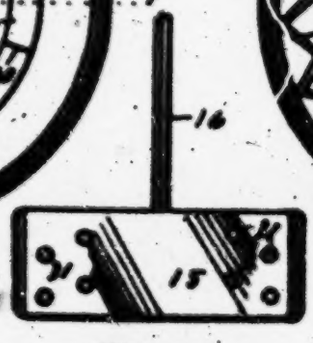


Fig. 6.

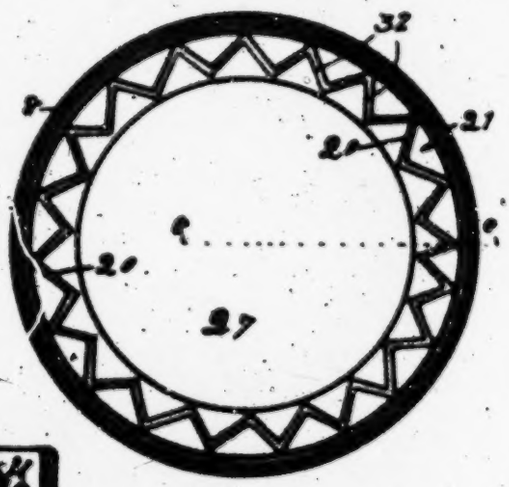


Fig. 5.

Fig. 7.

WITNESSES:

R. S. Wade

Ada M. Hawkins

INVENTORS:

Willard E. Foster

Lewis E. Garrison

BY

Lucius C. West.

ATTORNEY.

UNITED STATES PATENT OFFICE.

WILLARD C. FOSTER AND LEWIS E. GARRISON, OF KALAMAZOO, MICHIGAN; SAID FOSTER ASSIGNOR TO D. W. PHILLIPPY, OF KALAMAZOO, MICHIGAN.

WASHING-MACHINE.

No. 832,787. Specification of Letters Patent. Patented Oct. 9, 1906.

Application filed June 19, 1905. Serial No. 266,077.

To all whom it may concern:

Be it known that we, WILLARD C. FOSTER and LEWIS E. GARRISON, citizens of the United States, and residents of Kalamazoo, in the county of Kalamazoo, State of Michigan, have jointly invented a new and useful Washing-Machine, of which the following is a specification.

The object of this invention is to facilitate the washing of clothes by the forceful contact of hot water against and through the clothes by the means of the improved features of construction herein described and claimed.

In the drawings forming a part of this specification, Figure 1 is a side elevation with a portion in section on dotted line *c c* in Fig. 4 and on dotted line *e e* in Fig. 5; Fig. 2, plan of Fig. 1; Fig. 3, an end view of the bottom of Fig. 6; Fig. 4, interior plan of bottom of machine; Fig. 5, plan of Fig. 1 with top and agitator removed; Fig. 6, side elevation of the agitator with rod broken away, and Fig. 7 is a plan of Fig. 6.

The parts of the drawings are pointed out by numerals.

The ordinary metal washtub 8 is provided with a cover 9, which cover has a door 10, hinged at 11 and 12 and held closed by buttons 13 and 14. Through the door 10 the hot water is put in, and the clothes and the agitator 15 are put in and taken out. A rod 16 of the agitator 15 extends up through a bearing-tube 17, attached to the center of the cover 9, and a crank 18 is attached to the upper end of said rod 16 and held by a nut.

It is our purpose to provide the machine with the two following important features: first, hot-air and hot-water spaces within the wall of the tub 8 and circling around the tub interior and separated from the same to prevent the hot water in the machine in which the clothes are being washed from cooling too fast; second, a circular row of flat surfaces at right angles to each other in the interior of the machine, where the washing of clothes is being done, in a manner that the water will be splashed squarely against said flat surfaces by the action of the agitator 15, and from which surfaces said water is reacted back against and through the clothes. We accomplish these two purposes or objects in a cheap and very simple manner by providing the shell 20 and in the manner of its construction. This shell is metal and hoop or drum like in form and open at top and bottom ends. Its thin wall is bent to form coarse corrugations, which thus appear on both the outer and inner surface of the wall of the shell 20. The size of this corrugated shell is such that it will closely and easily and detachably fit into the tub 8, as in Figs. 1 and 5, the apexes of the outer corrugations just touching the interior of the wall of the tub 8, as in Figs. 1 and 5, and thus establishing a circular row of hot-air and hot-water three-cornered spaces 21 entirely around the tub 8 between its wall and the wall of said corrugated shell 20.

By the touching of all the outer apexes of the corrugations against the inner wall of the tub more room in a given size construction is had for the clothes, the shell is held steady in one position, allowing of no side play and cramping, and the hot-air and hot-water spaces, though separate from and independent of each other, are located very close to each other and have more nearly the effect of a single space around the tub. At the same time by the same construction the inner flat surfaces above described are established, and said surfaces 32, Fig. 5, do not in any sense serve as rubbing-surfaces for the clothes. The clothes are freely tossed forth and back in the water in which they float by the agitator 15 in a manner to force the water through the clothes, and thus remove the dirt without wear. The raised portion 19 is for attachment of wringer. The corrugated shell 20 is provided with upper holes 22 and lower holes 23, leading into the spaces 21, through which holes, owing to their small size and fixed location, hot air and steam circulate with more or less force, acting upon the clothes. The shell 20 is easily detached for cleaning. The agitator 15 is an important feature, owing to its peculiar construction, by means of which the water is given an upward forward throw, some of it squarely against the inner flat angled surfaces of the shell 20, from which it reacts forcibly upon the clothes. The body of the agitator is thin and rectangular in form. The upper outer portion of one side at one end, the lower outer portion of the opposite side at the same end, the upper outer portion of

said opposite side at the other end, and the lower outer portion of the first-named side at the latter-named end are all scooped out, as in Figs. 3, 6, and 7. The series of holes 31 through the body of the agitator allow the water to pass through and cause it to operate easier.

To cause the machine to operate easier if overloaded with clothes, we use a supplemental bottom 27, mounted on a central pivot 24 and ball-bearings 25, said pivot 24 loosely fitting a central socket 26 in the bottom of the tub 8. This bottom has downwardly-extending grooves 29, in which are partitions 30, forming pockets 28 for the balls 25. If care is used to not overload the washing-machine, the supplemental bottom can be dispensed with.

In the operation the supplemental bottom 27 and boiling hot water are placed in the tub 8. The cover 9 is placed on, observing to leave the door 10 open. As the agitator-rod 16 is loose in its bearing-tube 17, it can be moved up and down, so as to handle the door 10 and agitator 15 without disconnecting them. Now place in a few clothes and the agitator 15 and close and fasten door 10. Such soap may be used as desired. Swing the crank forth and back about the distance one can reach for perhaps ten minutes, or it may be entirely revolved now and then in alternation with the short swinging movement. Run the clothes through the machine more than once, if desired.

Having thus described our invention, what we claim as new, and desire to secure by Letters Patent of the United States of America, is—

In a washing-machine, an outer tub combined with a shell open at top and bottom, and made from a continuous metal band corrugated to form the inner and outer flat surfaces described, said shell adapted to fit detachably into the tub, the outer apexes of its corrugations touching the inner surface of the tub-wall making the three-cornered, separated, independent, hot-air and hot-water spaces closely located end to end to each other around the tub interior, and the small holes near the top and bottom of the shell leading through the same, substantially as set forth.

WILLARD C. FOSTER.
LEWIS E. GARRISON.

Witnesses:
S. H. VAN HORN,
FRANK NILLS.

F. A. & S. W. MILLS.

GEARING.

APPLICATION FILED JAN. 2, 1913.

1,118,210.

Patented Nov. 24, 1914.

5 SHEETS—SHEET 1.

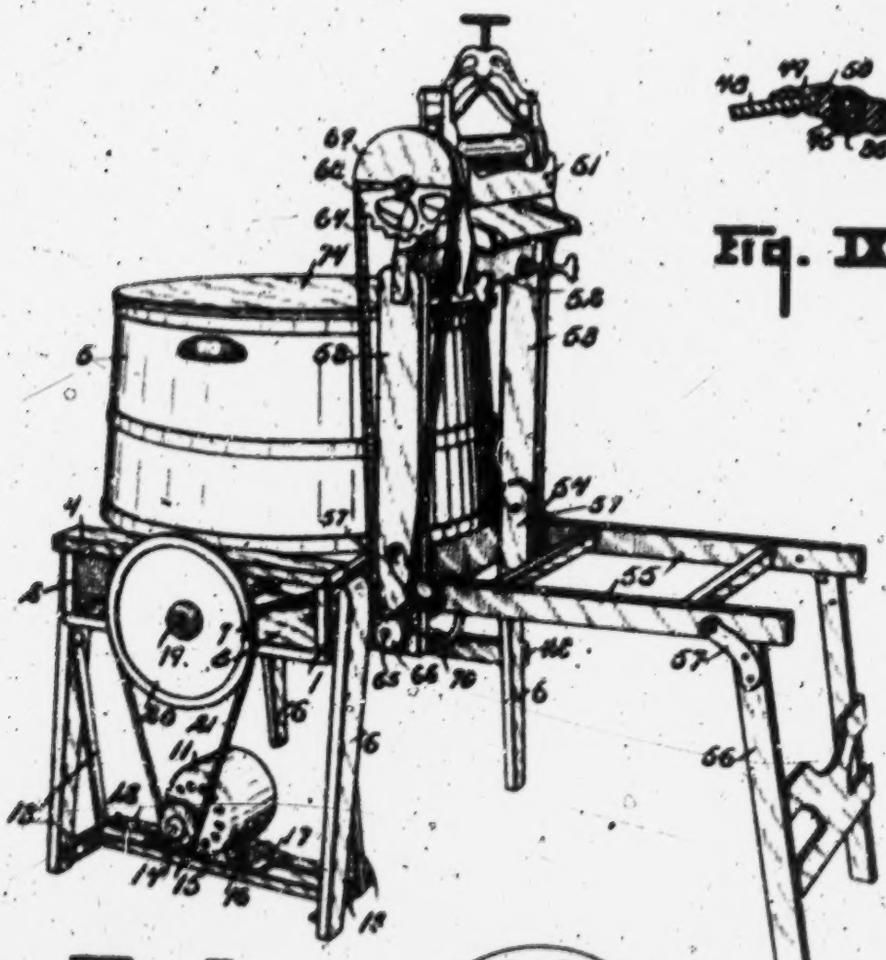


Fig. I.

Fig. IX.

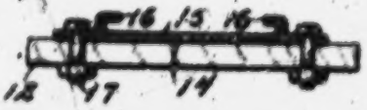


Fig. VIII.

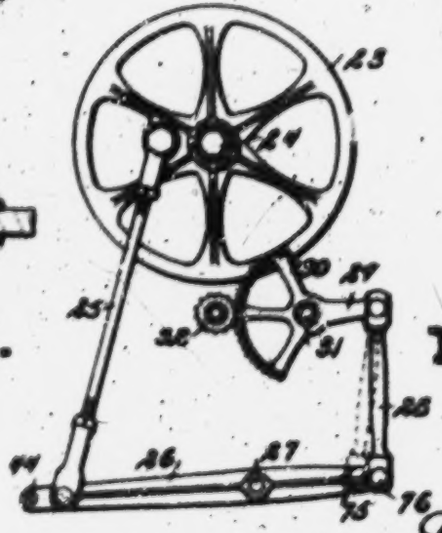


Fig. VII.

Witnesses
M. C. Woodruff
L. G. Greenfield

Inventors
Fred A. Mills
and Sam W. Mills
By Chappell & Earl
Attorneys

891

F. A. & S. W. MILLS.

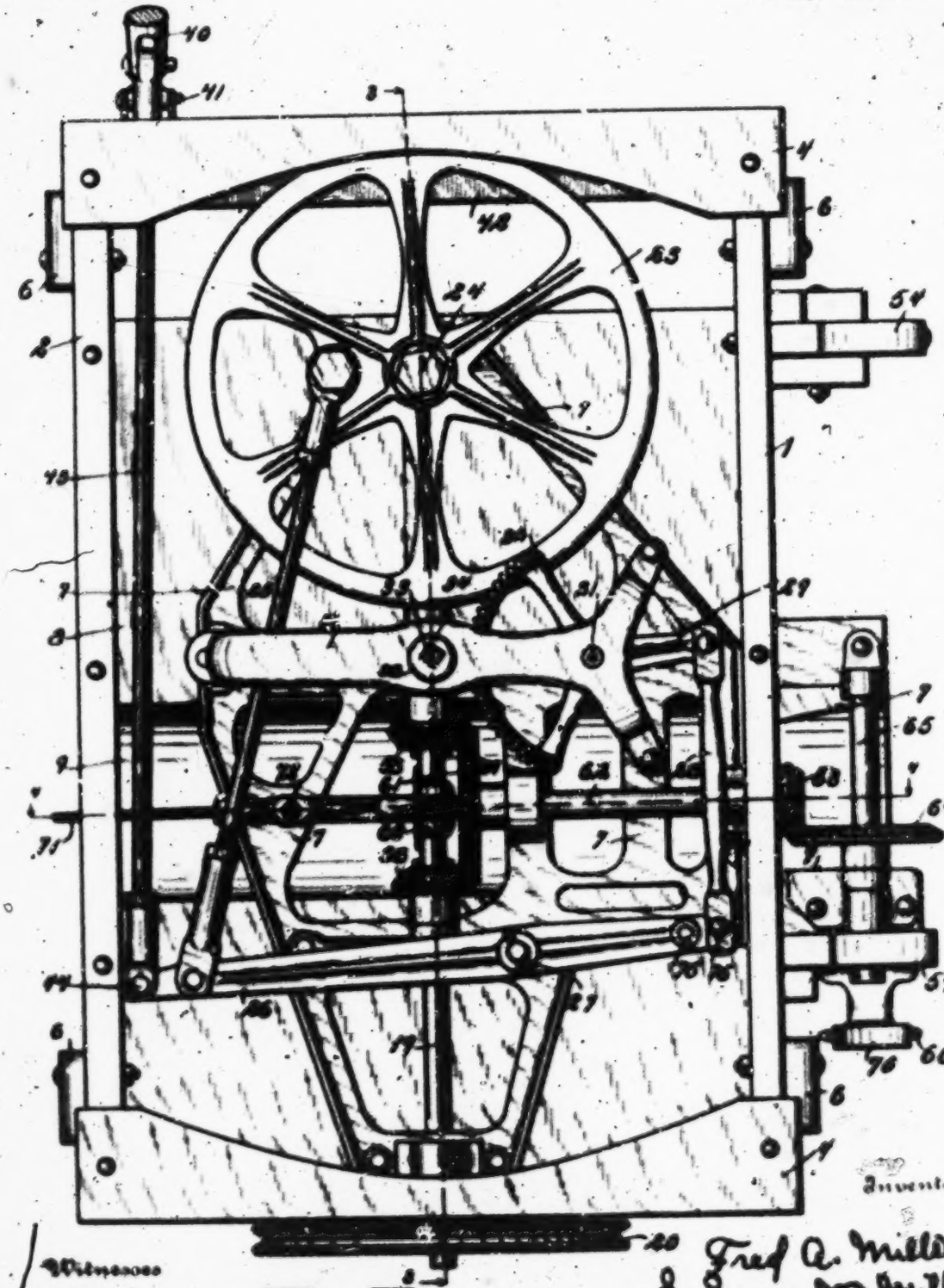
GEARING.

APPLICATION FILED JAN. 2, 1913.

1,118,210.

Patented Nov. 24, 1914.

4 SHEETS-SHEET 2.



Witnesses
M. P. Wendroff
L. G. Sanford

Fig. II.

Fred A. Mills
and Sam W. Mills
By Chaffee & Earl
Attorneys

892

F. A. & S. W. MILLS.

GEARING.

APPLICATION FILED JAN. 7, 1913.

1,118,210.

Patented Nov. 24, 1914.

5 SHEETS—SHEET 3.

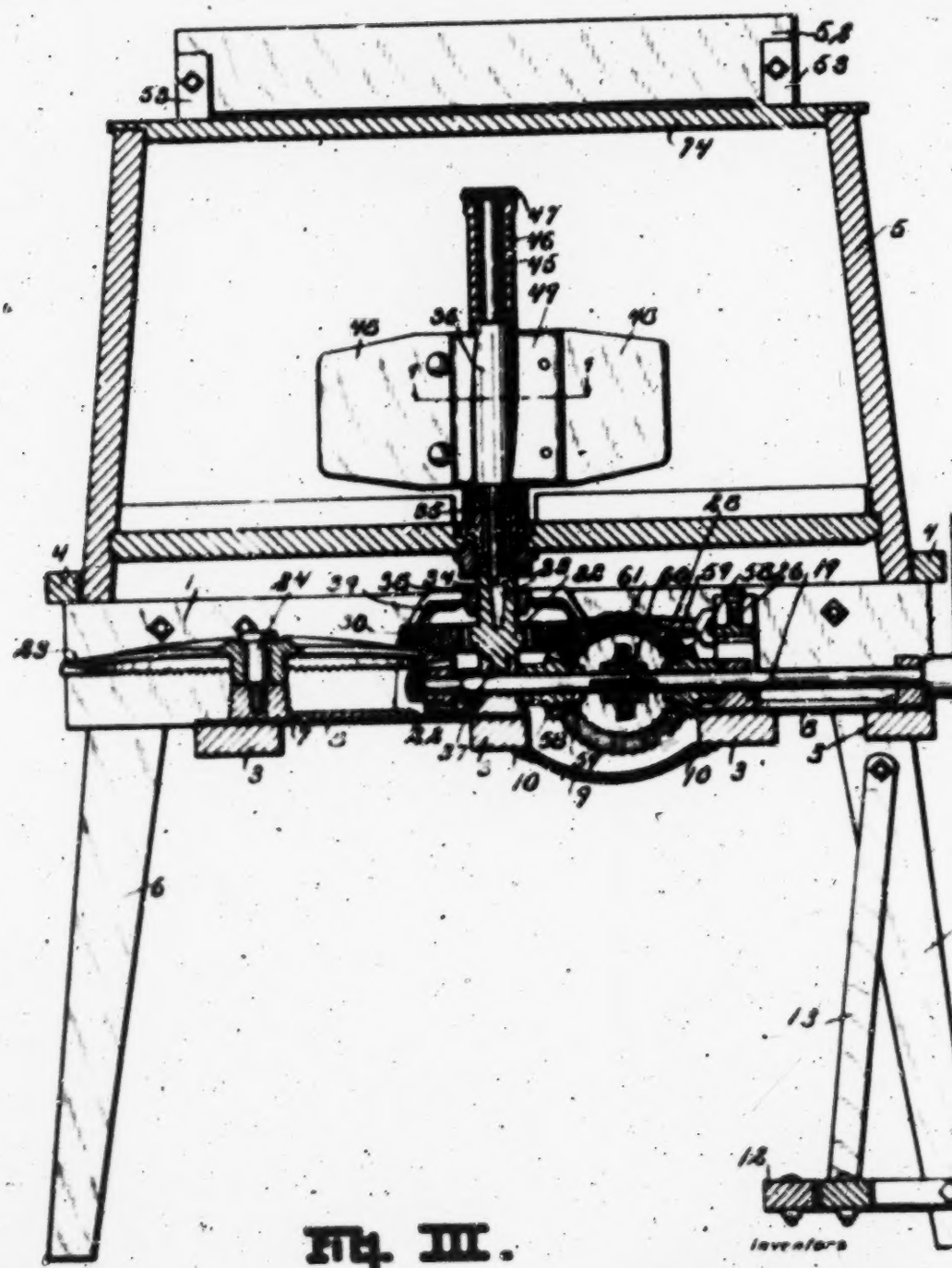


Fig. III.

Witnesses
M. J. Woodruff
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Fred A. Mills
and Sam W. Mills
By Chaffee & Earl
Attorneys

F. A. & S. W. MILLS.

GEARING.

APPLICATION FILED JAN. 2, 1913.

1,118,210.

Patented Nov. 24, 1914.

5 SHEETS—SHEET 4.

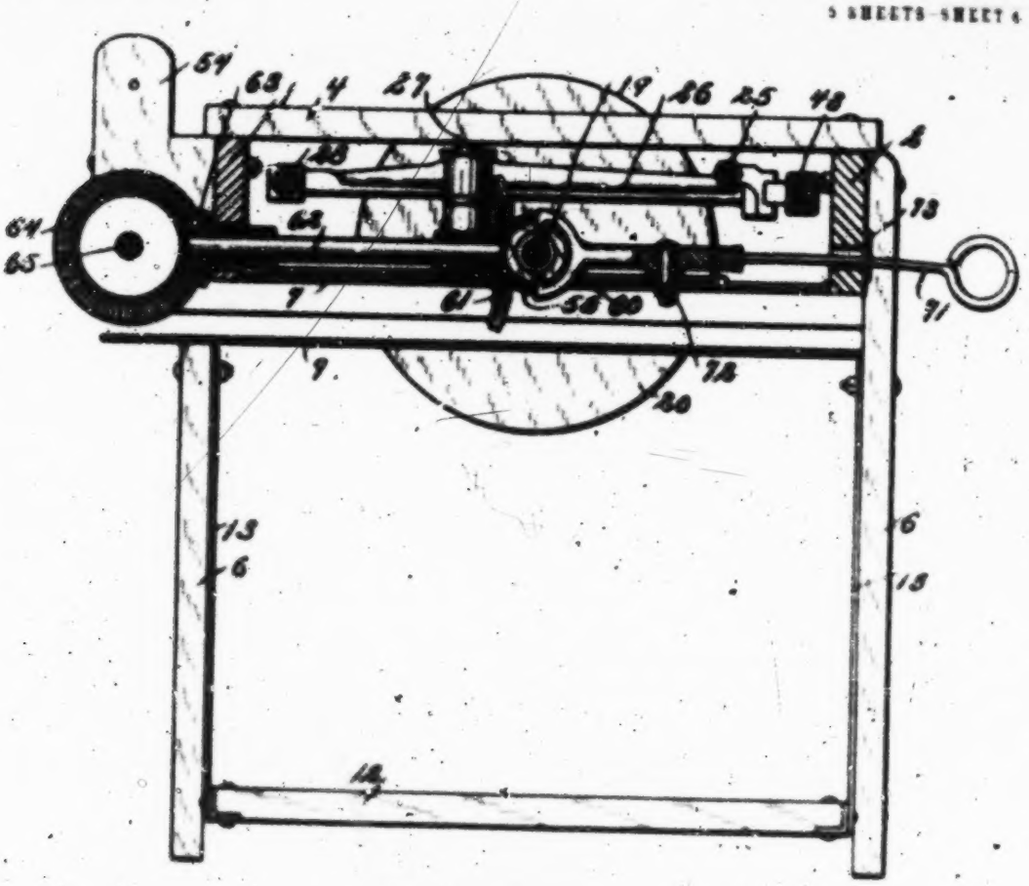

Fig. IV.

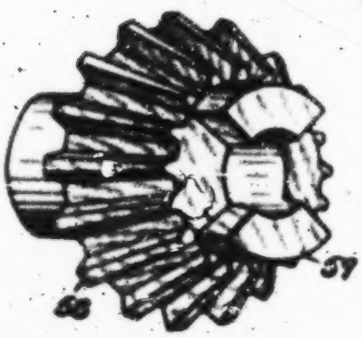

Fig. V.

Fig. VI.

Witnesses
M. P. Woodruff
L. G. Greenfield

Inventors
Fred A. Mills
and Sam W. Mills
By Chappell Heard

F. A. & S. W. MILLS.

GEARING.

APPLICATION FILED JAN. 2, 1913.

1,118,210.

Patented Nov. 24, 1914.

5 SHEETS—SHEET 5.

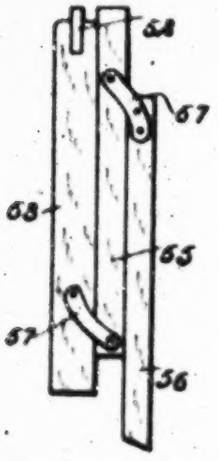

Fig. XI.

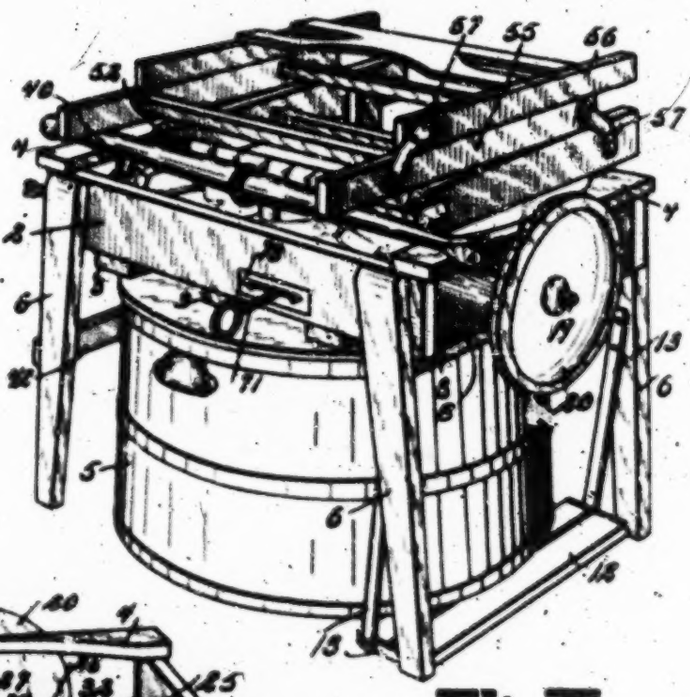

Fig. X.

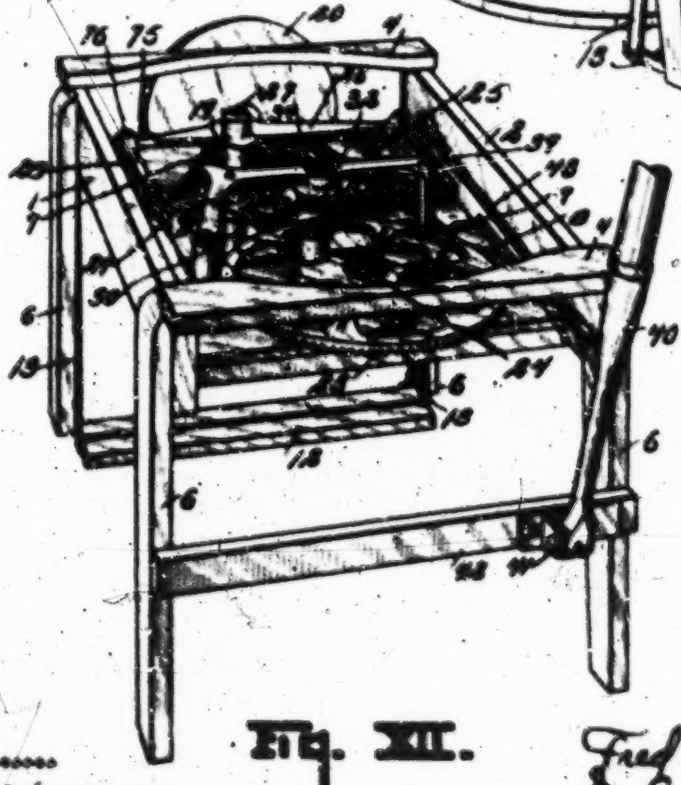

Fig. XII.

Witnesses
M. P. Woodruff
L. B. Greenfield

Inventors
Fred A. Mills
and Sam W. Mills
By Chaffell & Earl
Attorneys

895

UNITED STATES PATENT OFFICE.

FRED A. MILLS AND SAM W. MILLS, OF KALAMAZOO, MICHIGAN.

GEARING.

1,118,210. Specification of Letters Patent. Patented Nov. 24, 1914.

Application filed January 2, 1913. Serial No. 739,746.

To all whom it may concern:

Be it known that we, FRED A. MILLS and SAM W. MILLS, citizens of the United States, residing at Kalamazoo, Michigan, have invented certain new and useful Improvements in Gearing; of which the following is a specification.

This invention relates to improvements in gearing for washing machines.

The main objects of this invention are: First, to provide an improved gearing well adapted for use in washing machines. Second, to provide an improved gearing well adapted as a driving mechanism for washing machines which is adapted for either motor or for manual power. Third, to provide an improved washing machine in which the tub may be readily removed or replaced and the agitator readily connected to or disconnected from the driving mechanism. Fourth, to provide an improved washing machine embodying these advantages, which is easily collapsed for transportation or storage, and one which may be packed in a very compact package and readily set up for use by an inexperienced person.

Further objects, and objects relating to structural details, will definitely appear from the detailed description to follow.

We accomplish the objects of our invention by the devices and means described in the following specification. The invention is clearly defined and pointed out in the claims.

A structure which is a preferred embodiment of our invention is clearly illlustrated in the accompanying drawing forming a part of this specification, in which:

Figure I is a perspective view of a structure embodying the features of our invention. Fig. II is a plan view of the driving mechanism and supporting frame therefor. Fig. III is a detail vertical section on a line corresponding to line 3—3 of Fig. II. Fig. IV is a detail vertical section on a line corresponding to line 4—4 of Fig. II. Fig. V is a detail perspective of one of the gears 58 through which the wringer is driven. Fig. VI is a detail perspective view of the clutch collar 60. Fig. VII is a plan view of a part of the driving mechanism removed from the frame. Fig. VIII is a detail perspective view of the motor supporting plate 14. Fig. IX is a horizontal section through the agitator, on a line corresponding to line 9—9 of Fig. III. Fig. X is a perspective view of the structure collapsed for storage or transportation. Fig. XI is a detail side elevation showing the auxiliary stand collapsed against the wringer standard. Fig. XII is a perspective view of a modified form of the driving mechanism, the wringer-driving mechanism shown in the other views being omitted.

In the drawing similar reference characters refer to similar parts throughout the several views, and the sectional views are taken looking in the direction of the little arrows at the ends of the section lines.

Referring to the drawing, we provide a main frame consisting, in the structure illustrated, of front and rear sills 1 and 2 respectively, and cross sills or pieces 3 and 4, the cross pieces 3 being arranged on the under side of the front and rear sills and the cross pieces 4 being arranged on top of the same and curved on their inner edges to receive the tub 5 which is adapted to rest on the sills 1 and 2. The legs 6 are secured to the sills 1 and 2.

The driving mechanism is supported on a suitable skeleton frame 7 disposed horizontally on the cross pieces 3 between the sills 1 and 2. The frame 7 is a casting and is provided with suitable bearings and pivot studs for the driving mechanism. Below the frame 7 are plates or trays 8 and 9 which serve to collect any oil or the like dripping from the bearings. The tray 9 is arranged on the under sides of the intermediate cross pieces 3 in order to accommodate certain of the gears, as clearly shown in Fig. III. This tray 9 is removably supported by slides 10 secured to the under sides of the cross pieces 3.

The motor 11, an electric motor being shown in conventional form, is mounted on the shelf 12 supported under the frame by the brackets 13. The motor is supported by base plate 14 having a seat 15 with overhanging flanges 16 adapted to receive the base of the motor. The base plate is adjustably secured to the shelf by means of the bolts 17 engaging the longitudinal slot 18 in the shelf. The belt 21 may be tightened by adjusting the plate 14 on the shelf.

The driving shaft 19 is provided with a belt wheel 20 for the motor belt 21. The

driving shaft 19 is supported in suitable bearings on the frame 7. On the inner end of the driving shaft 19 is a beveled gear 22 meshing with a gear on the horizontally disposed crank wheel 23 which is supported on the stud bearing 24 on the frame 7. The gear 23 is connected by the connecting rod 25 to the lever 26 pivoted on the stud 27 on the frame 7. The lever is connected by the link 28 to the arm 29 of the segment 30. The segment 30 is journaled on the stub shaft 31. The segment 30 meshes with the agitator gear 32 having a socket 33 in its hub 34 adapted to receive the spindle 35 of the agitator 36. The pinion 32 is supported in a horizontal position, by a socket-like bearing 37, its upper end being supported by a bearing 38 in the spider 39 mounted on the frame 7. The spider 38 also is provided with a bearing for the shaft 31 of the segment 30. With thus the parts arranged, the agitator gear 32 is driven with an oscillating movement and the power is multiplied so that but little motor power is required to operate the machine.

The driving mechanism is compactly arranged and disposed within the main frame between the front and rear sills. The driving shaft 19 is horizontally disposed and the crank wheel 23 is horizontally disposed at the inner end of the driving shaft. The lever 20 is arranged transversely of the frame and driving shaft, it being located above the shaft. The segment 30 is disposed between the crank wheel and the lever, while the agitator gear 32 is centrally disposed above the driving shaft between the crank wheel and lever. The connecting rod 25 is on one side of the driving shaft, while the link 28 is on the other. The hand lever and its connections and the wringer connections are also arranged with a view of economizing space.

The hand lever 40 is pivoted at 41 on the cross piece 42 at one end of the frame and is connected by the link 43 to the lever 26. Ordinarily when driven by a motor, the hand lever is removed. To do this it is only necessary to remove its pivot 41 and the pivot 44 for the link to the lever. It may, of course, be left upon the machine while the machine is driven by the motor as it merely swings back and forth.

On the bottom of the tub we mount a tube 45. The sleeve-like hub 46 of the agitator 36 fits over this tube while the agitator spindle 35 extends through the same into engagement with the agitator gear 32. The spindle is secured to the upper end of the sleeve by means of the pin 47 and projects through the bottom of the tub to engage the socket in the agitator gear 32 as stated. The agitator is not connected in any way to the tube 45. The agitator is supported by the spindle which rests in the socket as stated. The tube projecting up within the agitator sleeve prevents the water escaping from the tub.

The agitator blades 48 are secured to flanges 49 having seats 50 for the inner ends of the blades, the flanges being formed integrally with the sleeve 46. See Fig. IX. This forms a simple but satisfactory structure, for the agitator, and its blades which are preferably of wood, are supported so that they are not likely to split or warp.

The wringer 51 is mounted on the cross piece 52 of the wringer supporting frame by means of suitable clamps. The wringer supporting frame consists of suitable uprights or standards 53 connected at their upper ends by the cross piece 52. The uprights or standards 53 are pivotally mounted on the upwardly projecting brackets 54 on the rear frame piece 2 so as to collapse forwardly upon the main frame when the tub is removed. See Fig. X.

The auxiliary tub bench or stand is pivotally connected to the uprights 53 by straps 57 to collapse against the wringer support, as shown in Figs. X and XI. The legs 56 for the tub bench 55 are pivotally supported by straps 57 so as to collapse, as shown.

The ends of the horizontal or sill members of the bench 55 abut the edges of the uprights 53 when the stand is extended. When collapsed, the stand 55 is raised up and swung on the pivots connecting the same to the straps 57 so that its sill members lie edge to edge with the uprights 53—see Fig. XI—and is supported in this position without additional securing or attaching means. The wringer standard may be collapsed upon the main frame without removing the wringer.

To drive the wringer in either direction, we mount a pair of beveled gears 58 on the driving shaft 19, the gears being rotatably mounted on the shaft. These gears are provided with clutch jaws 59, while the clutch collar 60 is splined to the driving shaft 19 and adapted to be shifted into engagement with either of the gears 58 or to a neutral position, as shown in Fig. II.

Arranged in mesh with both of the gears 58 is a gear 61 mounted upon the end of the driven shaft 62 which is supported in suitable bearings on the gearing frame 7. The outer end of the shaft 62 is provided with a bevel gear 63 meshing with a gear 64 on the shaft 65. The shaft 65 is supported on the ends of the intermediate cross pieces 3 and on arms on the frame 7 which keeps all the parts of the driving mechanism in proper alinement. The shaft 65 is provided with a sprocket 66 connected by the sprocket chain 67 to the sprocket 68 of the wringer. The sprocket 68 is provided with a housing 69 while the sprocket 54 is provided with a gear 70. The clutch collar 60

is shifted by the lever 71 which is mounted on the pivot 72 on the frame 7. The lever projects through a keeper plate 73 on the front sill 1. The keeper plate is suitably notched to hold the lever in its adjusted positions. With these driving connections, the wringer may be driven in either direction so that in use, the articles may be wrung from the washing tub into a rinsing tub on the bench 55 and the wringer reversed and the articles wrung from the rinsing tub and delivered onto the cover 74 of the tub 5 which is adapted to receive the same. This may be done while the second batch of laundry is being washed.

The structure is easily knocked down for storage or transportation as the tub can be lifted off either before or after the agitator is removed although, in practice, it is preferable that the agitator be taken out of the tub before the tub is lifted from the stand.

The wringer is of the ordinary clamp type and can be readily removed from its standard when the stand or bench 55 may be collapsed against the standard and the standard collapsed forwardly onto the main frame, as shown in Fig. X.

When the structure is packed for transportation or storage, the tub 5 may be slipped under the main frame after the motor has been removed. The motor is preferably separately crated as that should be fully protected. By placing the tub under the frame as shown in Fig. X, the frame serves as part of the packing crate and but little additional crating is required. The structure collapsed as illustrated, is very compact.

In the modification shown in Fig. XI, the wringer and driving mechanism therefor is omitted.

To change the stroke of the agitator, we provide the lever 26 with a plurality of holes 75 for the connecting pivot 76 of the link 28 thereto.

The tray or pan 9 is removed when the structure is packed for shipment, as shown in Fig. X.

Our improved washing machine is very simple and easy to operate, as it is only necessary in setting it up to place the tub on the frame and drop the agitator hub over the tube 45.

The structure is very easy to operate and may be readily driven through the hand lever 40. A motor of small horse power is sufficient.

We have illustrated and described our improvements in a form in which we have embodied the same in practice. We have not attempted to illustrate or describe various modifications which we contemplate as being possible, other than the modification in which the wringer is omitted, as we believe the disclosure made will enable those skilled in the art to which this invention relates to embody the same as conditions may require. We desire, however, to be understood as claiming our improvements specifically in the form illustrated as well as broadly within the scope of the appended claims.

Having thus described our invention, what we claim is new and desire to secure by Letters Patent is:

1. In a structure of the class described, the combination with the frame, of a horizontally disposed driving shaft, a horizontally disposed crank wheel provided with a beveled gear arranged at the inner end of the driving shaft, a beveled gear on the inner end of said driving shaft meshing with said crank wheel gear, a horizontally disposed lever pivoted to oscillate above said driving shaft and transversely thereof, a connecting rod connecting said crank wheel and lever, a segment provided with an arm mounted between said crank wheel and lever, a link connecting said arm to said lever, an actuating gear having a hub with a spindle socket therein, meshing with said segment, said gear being mounted centrally above said driving shaft and between said crank wheel and lever, an actuated member provided with a spindle adapted to engage the socket of said actuating gear.

2. In a structure of the class described, the combination with the frame, of a horizontally disposed driving shaft, a horizontally disposed crank wheel provided with a beveled gear arranged at the inner end of the driving shaft, a beveled gear on the inner end of said driving shaft meshing with said crank wheel gear, a horizontally disposed lever pivoted to oscillate above said driving shaft and transversely thereof, a connecting rod connecting said crank wheel and lever, a segment provided with an arm mounted between said crank wheel and lever, a link connecting said arm to said lever, and an actuating gear mounted centrally above said driving shaft and between said crank wheel and lever.

3. In a structure of the class described, the combination with the frame, of a horizontally disposed driving shaft, a horizontally disposed crank wheel provided with a beveled gear, a gear on said driving shaft meshing with said crank wheel gear, a horizontally disposed lever pivotally mounted on said frame above said driving shaft, an actuating gear mounted above said driving shaft between said crank wheel and lever, a link connecting said lever to said crank wheel disposed at one side of said actuating gear, a segment meshing with said actuating gear disposed at the other side thereof, and a link connecting said segment to said lever.

4. In a structure of the class described, the combination with the frame, of a driv-

ing shaft, a crank wheel provided with a beveled gear, a gear on said driving shaft meshing with said crank wheel gear, a pivotally mounted lever, a connecting rod connecting said crank wheel and lever, a segment, a link connecting said segment to said lever, an actuating gear having a spindle socket therein meshing with said segment, a body member having a tube mounted thereon, an actuated member provided with a spindle projecting from the lower end of said tube and engaging the socket of said actuating gear.

5. In a structure of the class described, the combination with the frame of a driving shaft, a crank wheel provided with a gear, a gear on said driving shaft meshing with said crank wheel gear, a lever pivotally mounted on said frame, a spider disposed on said frame between said crank wheel and lever and above said driving shaft, an actuating gear disposed below and having a bearing in said spider, a link connecting said lever to said crank wheel disposed below said spider on one side of said actuating gear, a segment disposed below and having a bearing in said spider at the other side of said actuating gear, and a link connecting said segment to said lever.

6. In a structure of the class described, the combination with the frame, of a crank wheel, means for driving said crank wheel, a lever pivotally mounted on said frame, an actuating gear mounted between said crank wheel and lever, a link connecting said lever to said crank wheel disposed on one side of said actuating gear, a segment meshing with said actuating gear disposed at the other side thereof, and a link connecting said segment to said lever.

7. In a structure of the class described, the combination with the frame, of a driving mechanism, comprising an actuating member mounted on said frame and having a spindle socket therein, a body member removably mounted on said frame having an upwardly projecting tube mounted thereon, and an actuated member with a hub-like sleeve adapted to embrace said tube and with a spindle secured to the upper end of said sleeve and projecting from the lower end of said tube when the actuated member is in position and into engagement with the socket of said actuating member, said actuated member being carried by its spindle, said spindle being unsecured to said actuating member and being freely removable from said tube.

8. In a structure of the class described, the combination with the frame, of a driving mechanism comprising an actuating member mounted on said frame and having a spindle socket therein, a body member having an upwardly projecting tube thereon, and an actuated member provided with a spindle projecting from the lower end of said tube into engagement with the socket of said actuating member, said actuated member being carried by its spindle, said spindle being unsecured to said actuating member and being freely removable from said tube.

9. In a structure of the class described, the combination with the frame, of a driving mechanism comprising an actuating member mounted on said frame, a body member removably mounted on said frame and having an upwardly projecting tube thereon, and an actuated member provided with a hub-like sleeve adapted to embrace said tube and with a spindle secured to the upper end of said sleeve and projecting from the lower end of said tube when the actuated member is in position and having driving engagement with said actuating member, said actuated member being carried by its said spindle, said spindle being freely removable from said tube.

10. In a structure of the class described, the combination with the frame, of a driving mechanism comprising an actuating member mounted on said frame, a body member removably mounted on said frame and having an upwardly projecting tube thereon, and an actuated member provided with a spindle projecting from the lower end of said tube when the actuated member is in position and having driving engagement with said actuating member, said actuated member being carried by its said spindle, said spindle being freely removable from said tube.

In witness whereof, we have hereunto set our hands and seals in the presence of two witnesses.

FRED A. MILLS. [L. S.]
SAM W. MILLS. [L. S.]

Witnesses:
M. PHINA WOODRUFF,
PEARL E. LILLIE.

P. T. COFFIELD & J. BREMER.

DRIVING MECHANISM.

APPLICATION FILED APR. 29, 1911.

1,131,466.

Patented Mar. 9, 1915.

2 SHEETS-SHEET 1.

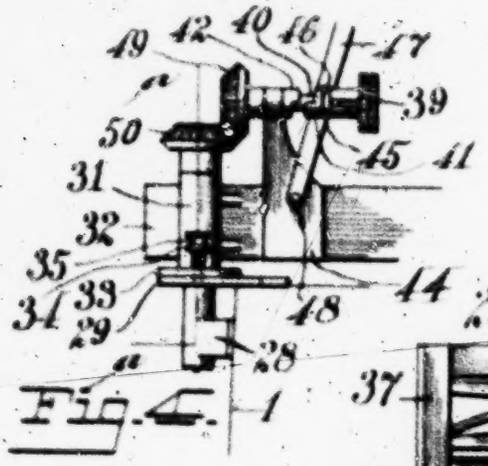

Fig. 4.

Fig. 5.

Fig. 6.

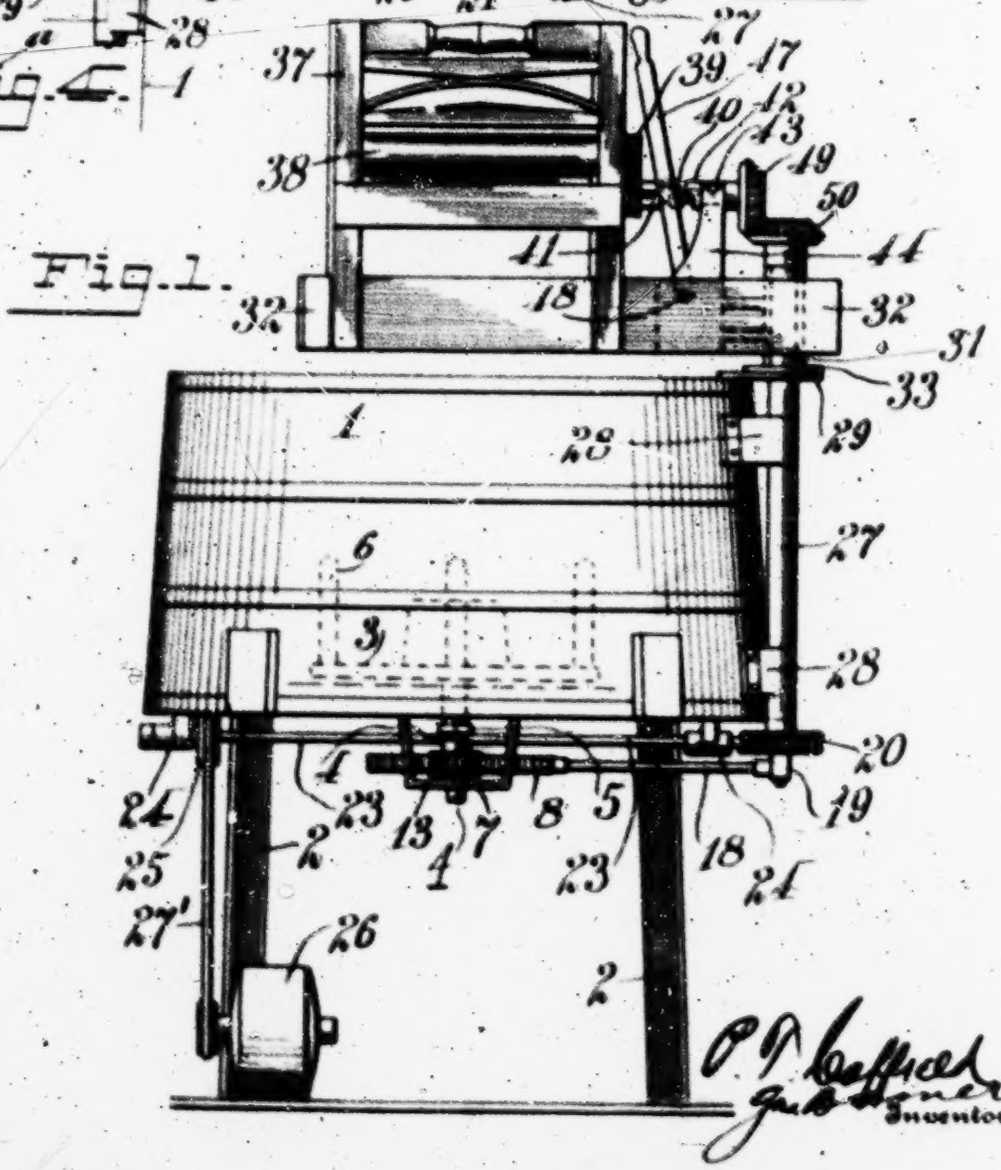

Fig. 1.

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DRIVING MECHANISM.

APPLICATION FILED APR. 29, 1911.

1,131,466.

Patented Mar. 9, 1915.

2 SHEETS-SHEET 2.

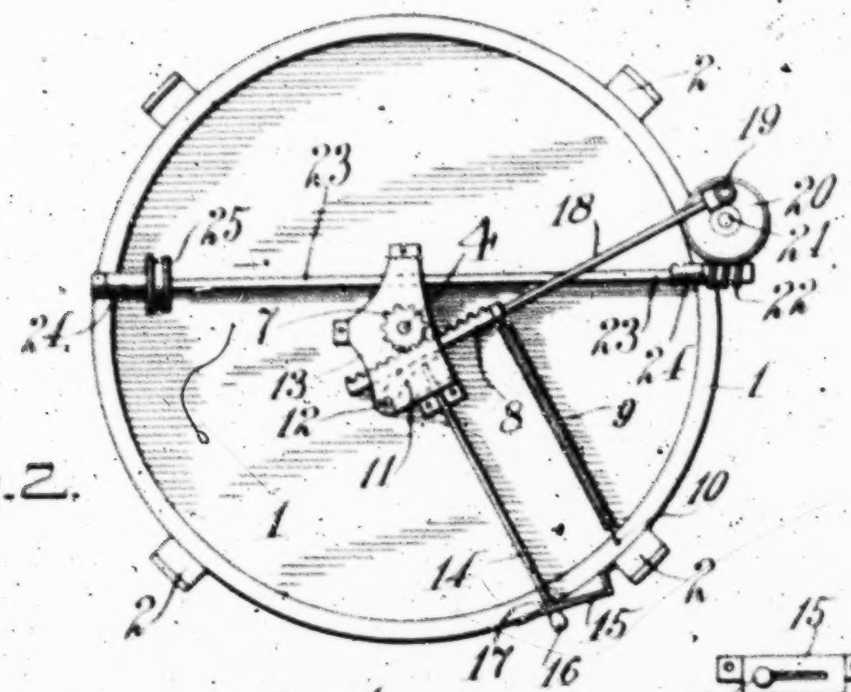


Fig. 2.

Fig. 7.

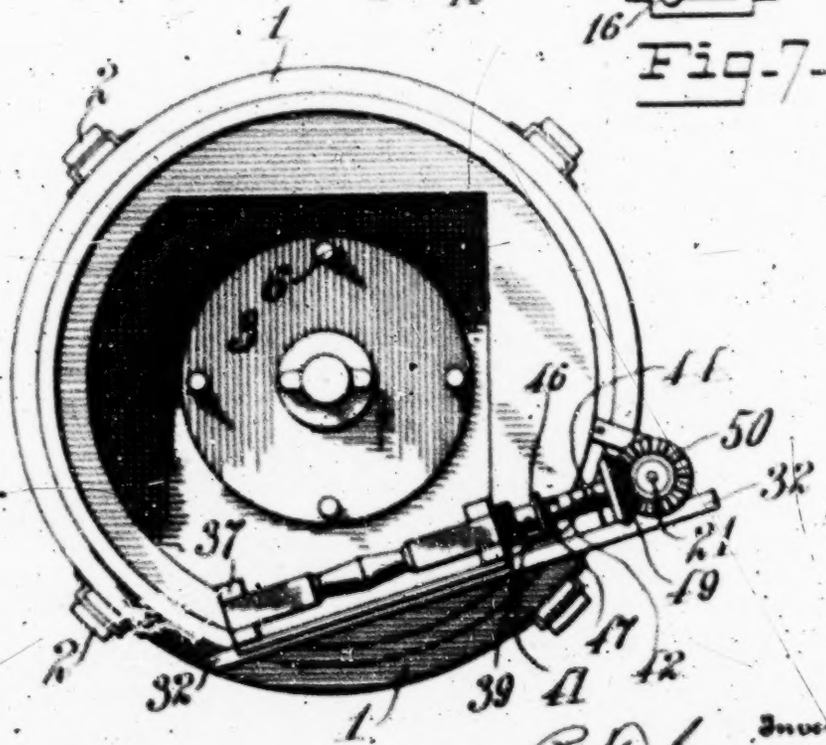


Fig. 3.

Witnesses,
M. Sukes
[illegible]

Inventors
P. T. Coffield
Jno. Bremer
By R. J. McCarty
their Attorney

UNITED STATES PATENT OFFICE.

PETER T. COFFIELD, OF DAYTON, AND JOHN BREMER, OF CINCINNATI, OHIO, ASSIGNORS, BY MESNE ASSIGNMENTS, TO MAYTAG COMPANY, OF NEWTON, IOWA, A CORPORATION.

DRIVING MECHANISM.

1,131,466. Specification of Letters Patent. Patented Mar. 9, 1915.

Application filed April 29, 1911. Serial No. 624,181.

To all whom it may concern:

Be it known that we, PETER T. COFFIELD and JOHN BREMER, citizens of the United States, residing at Dayton and Cincinnati, in the counties of Montgomery and Hamilton, respectively, and State of Ohio, have invented certain new and useful Improvements in Driving Mechanism; and we do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

This invention relates to certain new and useful improvements in driving mechanism for washing machines.

The object of the invention is to provide such mechanism whereby the operations of washing and wringing the clothes may take place simultaneously. To the above end, the clothes may be wrung from the tub in which they are washed directly, or the wringer may operate on previously washed clothes while other clothes are being washed, the wringer being adjustable or movable to various positions relative to the tub.

Referring to the accompanying drawings, Figure 1 is an elevation of a laundry installation constructed and arranged according to our invention. Fig. 2 is a bottom plan view of the same; Fig. 3 is a top plan view of the same; Fig. 4 is a detail view of a portion of the wringer gearing; Fig. 5 is a section on the line *a a* of Fig. 4, showing the wringer swivel and gearing; Fig. 6 is a detail plan view of the locking plate instrumental in holding the wringer in its various positions; and Fig. 7 is a view of the slotted plate instrumental in controlling the gearing between the motor and the wash tub.

Throughout the specification and drawings, similar reference characters indicate corresponding parts.

Referring more particularly to the drawings, 1 represents a wash tub of any preferred type which is supported on legs 2. Within said tub, and at the bottom thereof, is a dolly wheel or agitator 3 mounted on a vertical shaft 4 extending down through the bottom of said tub and through a stuffing box 5. The said dolly wheel 3 is provided with pins 6 which extend upwardly in the tub and engage the clothes within said tub to agitate the same during the oscillation of the dolly wheel. The said dolly wheel is oscillated by means of a pinion 7 mounted on the lower end of the shaft 4 and engaged by a reciprocating power-driven rack 8. Attached to the rack 8 is one end of a spring 9, the other end of which is attached at 10 to the tub 1 or other convenient point, Fig. 2. The said spring acts to disengage the rack 8 and pinion 7. The member 11 pivoted at 12, is held against the rack 8 by a reciprocating rod 14. The inner end of the rod 14 engages the member 11, while the outer end is mounted in a slotted plate 15. The said outer end of the rod 14 is provided with a finger piece 16 by which it is manipulated, and a collar 17 which lies on the inner side of said plate 15. When said rod is reciprocated in the slot in plate 15, the inner end will reciprocate the member 11, thereby permitting the pinion and rack to engage when the rod is in one position, and to disengage under the influence of the spring 9 when said rod is in the other position. A frame 13 is provided which serves as a support for the pivot 12 of the member 11, a bearing for the dolly wheel shaft 4, and a guide for the rod 14. The rack 8 is attached to one end of a connecting rod 18, the other end of which is pivoted to a crank pin 19 on a worm gear 20. The said gear 20 is mounted on a vertical shaft 21 (driven from the motor) and is in engagement with a worm 22 on a horizontal shaft 23 journaled in bearings 24 attached to the bottom of the tub. The shaft 23 is provided with a pulley 25 connected with a motor 26, preferably of the electric type, by a belt 27. The said motor 26 reciprocates the rack 8, and the extreme high speed of said motor is reduced to a comparatively low speed by the worm gearing 22 and 21. When the rack 8 is placed in engagement with the pinion 7, by the rod 14, the dolly wheel 3 will be oscillated by the rack 8.

Having described the particular driving connections between the motor and the dolly wheel of the tub, we will next describe the construction of the wringer.

The vertical shaft 21 is journaled in an upright elongated bearing 27 supported on

the side of the tub by brackets 28. The upper end of the bearing 27 terminates in a locking flange or plate 29 and a tubular stem 30. Pivotally mounted on said stem 30 is a sleeve 31 to which is attached a wringer board 32. The sleeve 31 is provided with a flange or plate 33 which coincides with the plate 29, and together they form a turntable. The said sleeve 31 is also provided with a projection 34 which receives a spring-controlled pin 35. The lower end of the pin 35 passes through an aperture in the plate 33 and is adapted to enter any one of a series of apertures 36 in the plate 29. The wringer board 32 and therewith the wringer, may thus be swung around the stem 30 to various positions in which they may be locked by the pin 35 and openings 36.

Mounted on the swinging supporting board 32 is the wringer 37 of any well known type and which is provided with upper and lower rollers 38 moving in unison through the medium of gears 39. The shaft 40 of the lower roller is provided with a clutch member 41 splined thereto and adapted to be placed in engagement with a similar clutch member 42, see Fig. 4. The clutch member 42 is mounted on a short shaft 43 journaled in a bearing 44 extending from the wringer board 32. The clutch member 41 is provided with a groove 45 which receives a pin 46 on a lever 47 pivoted at 48 to the wringer board. When the lever 47 is oscillated, the clutch member 41 will be thrown into and out of engagement with the clutch member 42, and thus the operation of the wringer controlled. Mounted on the short shaft 43 is a bevel gear 49 in mesh with a similar gear 50 on the upper end of the shaft 21. The shaft 21 is driven from the motor 26 through the belt 27, shaft 23 and gears 20 and 22, as before described.

The rollers 38 of the wringer are driven from the shaft 21 through the miter gears 49 and 50, and clutch members 41 and 42 when said clutch members are placed in engagement with each other by the lever 47. The wringer as before stated, may be swung around upon the stem 30 to various positions to wring the clothes from one tub into another, and said wringer may be locked in its position by the pin 35 before referred to.

From the foregoing description it will be seen that the washing machine and wringer may be operated from the same source of power and each operated independently or simultaneously as desired, thus enabling the washing to be done in the washer while the wringer is wringing through the rinse waters the clothes that have previously passed through the washer.

Having described our invention, we claim:

1. In a machine of the class described, a support, a vertical shaft thereon, means to drive said vertical shaft, a frame adapted to swing about said vertical shaft in a horizontal plane, a pair of adjacent roller shafts arranged one above the other supported in said frame, driving means whereby said roller shafts may be driven in any position of the support relative to the vertical shaft.

2. In a machine of the class described, a support, a vertical shaft thereon, a frame adapted to swing about said vertical shaft on an axis, a pair of parallel adjacent roller shafts geared together for rotation in opposite directions and arranged horizontally in said frame, provided with means whereby said roller shafts may be driven in any position of the support relative to said vertical shaft and means to lock said frame in adjusted position about said vertical shaft.

3. In a mechanism of the class described, the combination of a suitable support, a frame having bearings at each end, two parallel roller shafts mounted in said bearings and movable with said frame, said frame being mounted to swing bodily in a horizontal frame, a pinion on one of said parallel shafts, a vertical shaft carried by said support in vertical alinement with the pivotal axis of said horizontally swinging frame, a pinion arranged on said vertical shaft to mesh permanently with said first mentioned pinion which rolls around said second pinion when said frame is swung horizontally, and a motor mounted on said support for actuating said vertical shaft.

4. In a mechanism of the class described, the combination of a suitable support, a pair of horizontal roller shafts geared together and mounted on said support said shafts being adapted to swing in a horizontal plane, a pinion for one of said shafts, a vertical shaft carried by said support in vertical alinement with the pivotal axis of said horizontally swinging shafts, a pinion arranged on said vertical shaft to mesh permanently with said first mentioned pinion which rolls around said second pinion when the horizontal shaft is swung about its vertical pivot, a motor driven shaft mounted on said support, and a driving connection between said motor driven shaft and said vertical shaft.

5. In a mechanism of the class described, the combination of a support, a vertical shaft carried by said support, a pinion on said vertical shaft, a bracket mounted to swing about said vertical shaft as an axis, a frame supported by said bracket and having bearings, two parallel roller shafts carried by said frame and geared together, a pinion on the end of one of said roller shafts, said pinion meshing with the pinion of said vertical shaft and being adapted to roll around said last named pinion when said frame is swung around its vertical axis, means for securing said bracket after it has

been swung to a new position, a motor below said support, and driving connections between said motor and said vertical shaft.

6. In a mechanism of the class described, the combination of a support, a vertical shaft carried by said support, a pinion on said vertical shaft, a bracket mounted to swing about said vertical shaft as an axis, a frame supported by said bracket and having bearings, two parallel contiguous roller shafts carried by said frame and geared together for rotation in opposite directions, a gear connection between said vertical shaft and one of said roller shafts which connection remains operative when said frame is swung about its vertical axis, and means for securing said bracket after it has been swung to a new position.

7. In a mechanism of the class described, the combination of a suitable support, a pair of horizontal roller shafts geared together for rotation in opposite directions and adapted to swing in a horizontal plane, a vertical shaft carried by said support in vertical alinement with the pivotal axis of said horizontally swinging shafts, a gear connection permitting said horizontal shafts to swing about their vertical pivot while driving connection is maintained to said roller shafts, a driving shaft mounted on said support, and a driving connection between said driving shaft and said vertical shaft.

8. In a mechanism of the class described, the combination of a pair of horizontal roller shafts, resilient means for holding said roller shafts in operative position relative to one another, a frame supporting said roller shafts and movable outward from one location to a second location, driving gears for said roller shafts, a power shaft and driving connections for propelling said gears from said power shaft, said gears and connections being operative to drive said roller shafts when said frame is in either of the two locations.

9. In a machine of the class described, a support, a vertical shaft thereon, means to drive said vertical shaft, a frame adapted to swing about said vertical shaft in a horizontal plane, a pair of parallel adjacent roller shafts geared together and arranged horizontally one above the other in said frame, driving means whereby said roller shafts may be driven in any position of the support relative to said vertical shaft.

10. In a machine of the class described, a support, a vertical shaft thereon, means to drive said vertical shaft, a frame adapted to swing about said vertical shaft in a horizontal plane, a pair of parallel adjacent roller shafts geared together for rotation in opposite directions and arranged horizontally in said frame, driving means whereby said roller shafts may be driven in a plurality of positions of the support relative to said vertical shaft, and means to lock said frame in adjusted position about said vertical shaft.

11. In a machine of the class described, the combination of a support, a frame mounted to swing bodily in a horizontal contiguous plane relatively to the support, horizontal roller shafts geared together for rotation in opposite directions and mounted in said frame, a motor and driving connection between said motor and said roller shafts adapted to drive the roller shafts irrespective of the position of said frame relative to said roller shafts, and manually operated means for interrupting said driving connections.

In testimony whereof I affix my signature, in presence of two witnesses.

PETER T. COFFIELD.

Witnesses:
R. J. McCARTY,
HOWARD S. SMITH.

In testimony whereof I affix my signature, in presence of two witnesses.

JOHN BREMER.

Witnesses:
HENRY SCHROEDER,
W. MEREDITH YEATMAN.

Correction in Letters Patent No. 1,131,466.

It is hereby certified that in Letters Patent No. 1,131,466, granted March 9, 1915, upon the application of Peter T. Coffield, of Dayton, and John Bremer, of Cincinnati, Ohio, for an improvement in "Driving Mechanism," an error appears in the printed specification requiring correction as follows: Page 2, line 90, for the word "frame" read *plane;* and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 25th day of May, A. D., 1915.

[SEAL.]

R. F. WHITEHEAD,

Acting Commissioner of Patents.

H. L. STALEY.

WASHING MACHINE AGITATOR.

APPLICATION FILED JAN. 29, 1913.

1,155,107.

Patented Sept. 28, 1915.

Fig. 1.

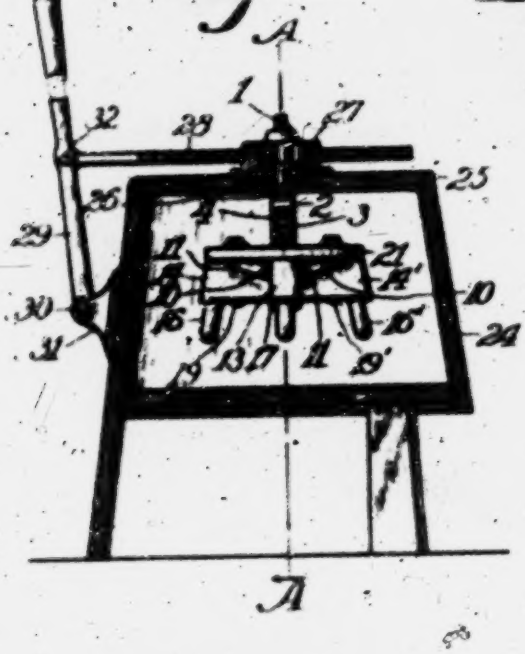


Fig. 2.

Fig. 3.

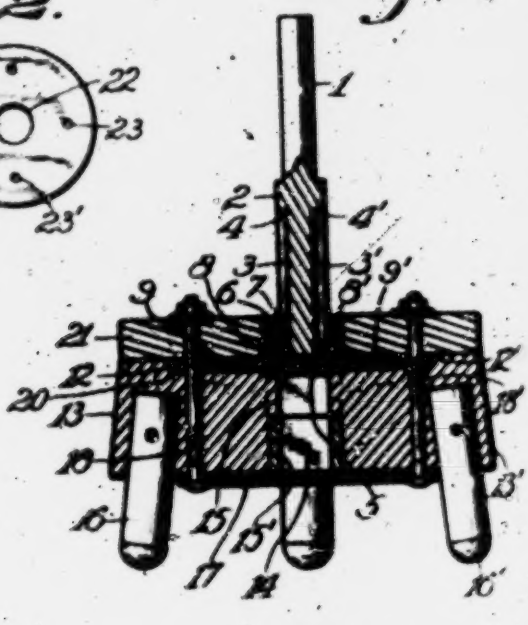


Fig. 4.

Fig. 5.

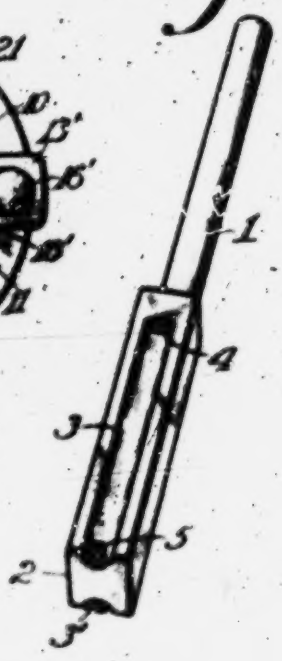
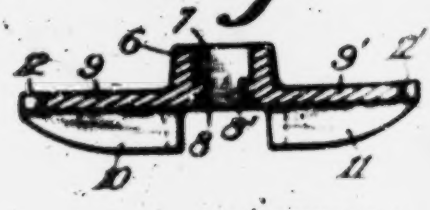


Fig. 6.

Fig. 7.



WITNESSES

J. H. Gardner

M. J. Kirkpatrick

INVENTOR

Harrison L. Staley

BY

E. D. Silvius

ATTORNEY

UNITED STATES PATENT OFFICE.

HARRISON L. STALEY, OF MARTINSVILLE, INDIANA.

WASHING-MACHINE AGITATOR.

1,155,107. Specification of Letters Patent. Patented Sept. 28, 1915.

Application filed January 29, 1913. Serial No. 744,832.

To all whom it may concern:

Be it known that I, HARRISON L. STALEY, a citizen of the United States, residing at Martinsville, in the county of Morgan and State of Indiana, have invented a new and useful Washing-Machine Agitator, of which the following is a specification, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon.

This invention relates to a washing machine appliance that is known as an agitator, a rubber, or a "dolly" and designed to be used in a tub or similar vessel for agitating the washing liquid and the articles to be cleansed, by rotary-oscillatory motion, the invention having reference more particularly to various features of construction of the agitator and its operating and controlling shaft.

An object of the invention is to provide an improved agitator for washing machines that shall be so constructed as to most effectually cause centrifugal motion of the washing liquid during the washing operation, a particular object being to provide an agitator which shall prevent the washing liquid from escaping upward while being agitated to produce gyratory and centrifugal motion of the liquid.

A further object of the invention is to provide an agitator that shall be adapted to be cheaply produced and readily repaired when partially worn out and which shall be durable and economical in use.

With the above mentioned and other objects in view, the invention consists in a rotary-oscillatory agitator having wings for producing centrifugal motion of the washing fluid and provided with webs for preventing the flow of the liquid upward and over the tops of the wings, the invention consisting further in certain novel features of construction in agitators for washing machines, and in the parts and combinations and arrangements of parts, as hereinafter particularly described and claimed.

Referring to the drawings, Figure 1 is a vertical central section of a washing machine tub to which the improved agitator is applied and provided with suitable operating mechanism; Fig. 2, a top plan of the web part of the agitator; Fig. 3, a vertical sectional view of the agitator approximately on the line A A in Fig. 1; Fig. 4, an inverted plan view of the agitator partially broken away; Fig. 5, a perspective view of the operating and controlling shaft of the agitator; Fig. 6, a perspective view of the hub portion of the agitator; and Fig. 7, a central section of the hub portion on an enlarged scale.

Similar reference characters throughout the several figures of the drawings indicate corresponding elements or features of construction herein referred to.

As preferably constructed, a suitable vertical operating shaft is provided which comprises a cylindrical upper portion 1 adapted to be rotatably supported and a lower guide portion 2 that is square in cross-section and has two longitudinal grooves 3 and 3′ in two opposite sides thereof respectively, the grooves extending from the lower end of the shaft upward a suitable distance so as to form stop shoulders 4 and 4′ at the upper ends of the grooves. When the structure is completed, a stop pin 5 is tightly secured in the lower end portion of the shaft transversely thereof and extends into the two grooves. An agitator hub 6 is provided which has a squared aperture 7 therein to receive the squared portion of the shaft, the hub being mounted on the shaft to slide thereon and in operation is turned by the shaft, the hub having two stop projections 8 and 8′ on the inner side of the wall thereof that extend into the grooves 3 and 3′ respectively and may be moved into contact either with the shoulders 4 and 4′ respectively or with the end portions of the pin 5. The hub has four identically shaped horizontal arms 9, 9′, 9″, 9‴ thereon that are plate-like in form and extend radially from the hub, and each arm has two flanges 10 and 11 on opposite edges thereof, the flange 10 of one arm being formed integrally with the flange 11 of the adjacent arm, and when the hub is in normal position the flanges extend downward from the arms. The end of each arm has a slot 12 or 12′ therein to receive a retaining bolt.

A suitable number of agitator wings or blades are provided and suitably secured to the arms of the hub, four wings preferably being employed so that two wings 13 and 13′ are formed integrally of one piece of wood and two similar wings 14 and 14′ are formed integrally of another piece of wood, the two pieces of wood being suitably recessed and crossed at their middle portions,

the middle portion of one piece having a squared hole 15 therein, the middle portion of the companion piece having a similar hole 15′ therein to receive the squared portion 2 of the operating shaft, the relative proportions being such as to permit the shaft to project slightly downward through the hole 15′ to permit the insertion of the stop pin 5. The several wings or blades are provided respectively with a downwardly projecting finger 16 or 16′ for moving the clothes or fabric to and fro in the tub as is customary. A tie-plate 17 is placed against the under side of the wooden piece that forms the two wings 13 and 13′ and closes the hole 15′, the plate having two retaining bolts 18 and 18′ that extend through the two wings and upward through the two slots 12 and 12′ respectively of two of the arms of the hub, two similar bolts 19 and 19′ being placed in the remaining two wings so as to extend upward through the slots of the remaining two arms. The normal upper sides or tops of the wings have recesses 20 to receive the arms of the hub.

The webs of the agitator wings or blades may be variously provided and preferably are produced by means of a disk 21 having a central aperture 22 therein that receives the hub 6, the disk being placed upon the arms of the hub and extending onto the end portions of the several wings or blades and fixedly secured by means of the retaining bolts which obviously are provided with nuts and heads, the disk having holes 23 or 23′ through which the bolts extend.

The disk, as will be seen, serves to web the upper portion of the wings or blades, the latter being reinforced by the flanges 10 and 11 so as to firmly fix them relative to the hub.

The vessel in which the agitator is mounted may be variously constructed and may suitably comprise a tub 24 provided with a cover 25 in the middle portion of which a journal box 26 is secured that rotatably supports the cylindrical portion 1 of the operating shaft, and supports also a toothed gear wheel 27 which is secured to the shaft and serves as a collar to hold up the shaft in normal position. The gear wheel is rotatably moved forward or backward by a suitably guided rack bar 28 and a lever 29, the latter being connected by means of a pivot 30 to a jaw 31 secured to the tub, the lever being connected by means of a pivot 32 to the rack bar. The operating gearing obviously may be of various construction, the agitator being designed for use in various types of washing machines.

In practical use, the gearing is actuated so as to impart rotary-oscillatory motion to the operating shaft of the agitator. The wings or blades and the fingers thereof bear down upon the clothes or fabrics and transmit their motion thereto and in the operations may move up or down relative to the guide portion of the operating shaft. The to and fro movement of the wings or blades cause the washing fluid to be forced outward toward the wall of the tub and unless restrained or confined, the water would be forced upward and escape over the tops of the wings more easily than to be forced centrifugally and through the fabrics, the liquid, however, in the present case being confined by the webbing of the wings so that the liquid is most efficacious in performing the cleansing operations.

Having thus described the invention, what is claimed as new is:—

1. In a washing machine agitator, the combination of a circular disk, a hub inserted in the disk and extending from the normal lower side thereof, arms fixed on the hub and extending against the lower side of said disk, wings seated on the lower side of the arms respectively, the outer portion of the arms being in contact with the lower side of said disk, and a plurality of bolts extending through said disk and also through the wings respectively, the bolts rigidly securing the wings and the disk to the arms.

2. In a washing machine agitator, the combination of a circular disk, a hub inserted in the disk and extending from the normal lower side thereof, arms fixed on the hub and extending against the lower side of the disk, each arm having an opening therein, wings seated on the lower side of the arms respectively, the upper side of each wing being recessed, the recess receiving the adjacent arm, the outer upper portions of the arms being in contact with said disk, and a plurality of bolts extending through said disk and also through said wings respectively and through the openings of said arms respectively, said bolts rigidly securing said wings and said disk to said arms and said wings directly to said disk.

3. In a washing machine agitator, the combination of a circular disk, a hub inserted in the normal lower side of the disk, four arms fixed on the hub and having each a slot in its end, the upper sides of the arms extending against the lower side of said disk, two pieces of wood that are recessed and crossed at their middle portions and forming four wings, the normal upper sides of the wings being recessed, each recess receiving an arm, the outer upper portions of the wings extending against the lower side of said disk, the middle portion of each piece forming said wings having each a hole therein, two bolts extending through said disk and the said slots in two of said arms and also through two of said wings and rigidly securing the disk and the wings to the arms, a shaft extending movably through said hub and said holes, a tie-plate seated on the

lower side of the middle portion of the lower one of said pieces and onto the wings formed thereby, said tie-plate extending across said holes and being movable by said wings into contact with the lower end of said shaft, and two bolts extending through said disk and the said slots in the adjacent two of said arms and also through said tie-plate and the adjacent wings and rigidly securing the said several parts together.

4. In a washing machine agitator, the combination with a hub having an aperture therein, a lug in the aperture fixed on the wall of the hub, and arms on the hub, of a shaft extending movably in the aperture, there being a groove in one side of the shaft receiving the lug, a pin inserted transversely in said shaft and extending into the groove to be engaged by said lugs, wings secured to said arms, and a tie-plate secured to said wings and extending opposite the end of said shaft to be moved by the arms into contact with the end of said shaft.

5. In a washing machine agitator, an element comprising an externally cylindrical hub, there being a squared aperture extending through the hub, four flat arms on the normal lower end of the hub, the end of each arm having a recess therein, two lugs on the inner side of the hub extending into the aperture relatively near to but not immediately at the lower end of the hub, and a plurality of flanges on the lower sides of the arms respectively, the flanges being on the opposite sides of the arms from the hub.

In testimony whereof, I affix my signature in presence of two witnesses.

HARRISON L. STALEY.

Witnesses:
COASON S. PARRISH,
B. R. ELDRIDGE.

1918

J. D. SPAUGY.

GEARING FOR WASHING MACHINES.

APPLICATION FILED APR. 26, 1916.

1,227,335.

Patented May 22, 1917.

2 SHEETS—SHEET 1.

Fig. 1.

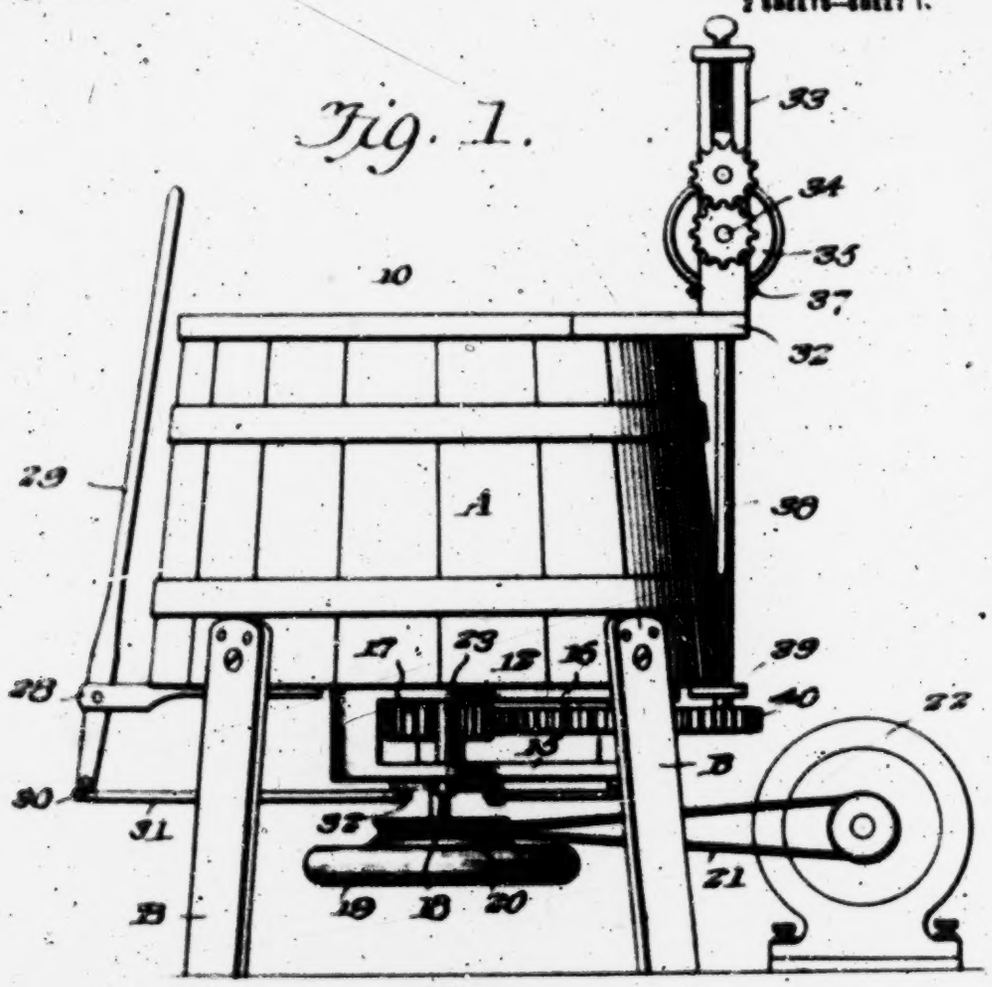
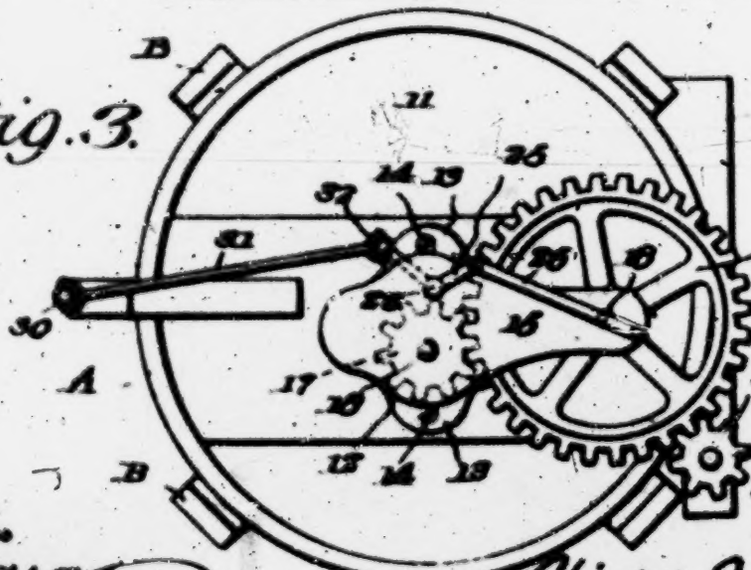


Fig. 3.



Witnesses

Hugh P. Gallagher

Inventor

J. D. Spaugy

By Victor J. Evans

Attorney

J. D. SPAUGY.

GEARING FOR WASHING MACHINES.

APPLICATION FILED APR. 28, 1916.

1,227,335.

Patented May 22, 1917.

2 SHEETS—SHEET 2.

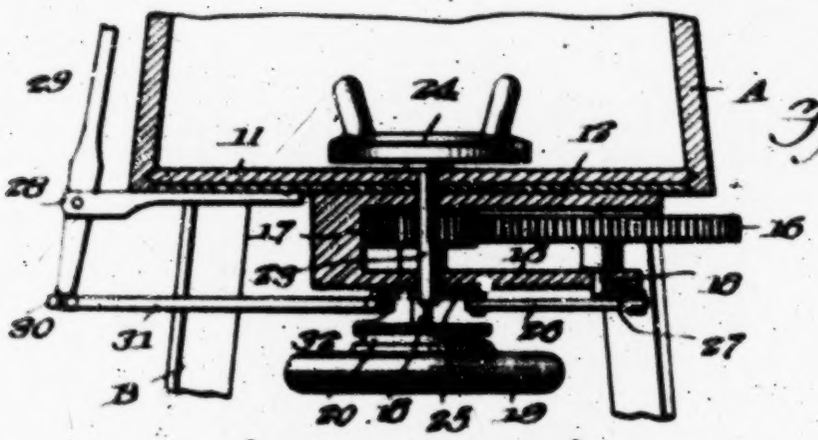


Fig. 2.

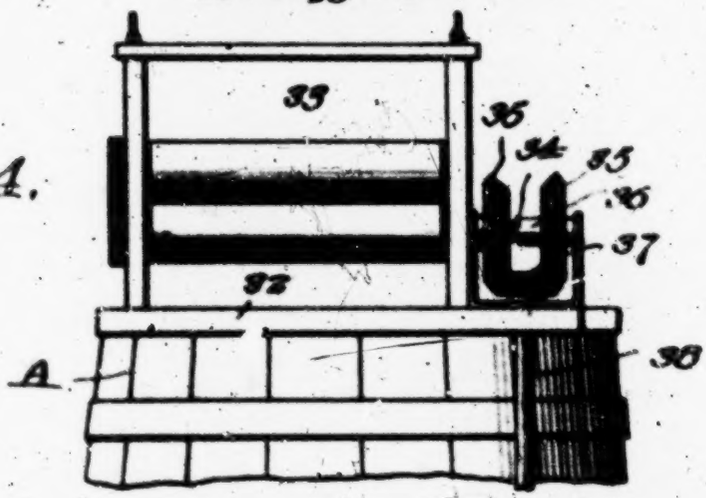


Fig. 4.

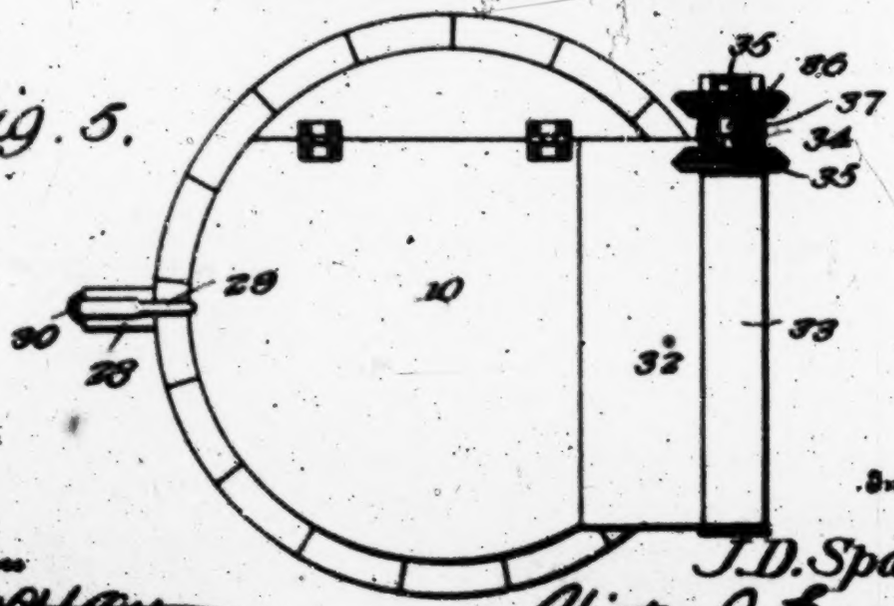


Fig. 5.

Witnesses

Hugh P. Hart

Inventor

J. D. Spaugy

By Victor J. Evans

Attorney

UNITED STATES PATENT OFFICE.

JACOB D. SPAUGY, OF MEYERSDALE, PENNSYLVANIA.

GEARING FOR WASHING-MACHINES.

1,227,335. Specification of Letters Patent. Patented May 22, 1917.

Application filed April 26, 1916. Serial No. 94,218.

To all whom it may concern:

Be it known that I, JACOB D. SPAUGY, a citizen of the United States, residing at Meyersdale, in the county of Somerset and State of Pennsylvania, have invented new and useful Improvements in Gearing for Washing-Machines, of which the following is a specification.

The invention relates to gearing, and more particularly to the class of gearing for washing machines.

The primary object of the invention is the provision of a gearing wherein there is employed cranks which coöperate with gears so that on rotation of the gears the cranks will convert such motion into reciprocatory movement whereby an agitator within a washing tub will be driven in this manner.

Another object of the invention is the provision of gearing of this character wherein the same is mounted upon the bottom of the tub, thereby leaving the top of said tub free so that the cover or lid for the tub can be opened without being burdened with gearing or other parts and also eliminating any possibility of danger to the operator as the gearing is out of reach and obscured from view.

A further object of the invention is the provision of gearing of this character wherein the same can be run by a motor or by hand and is designed especially for use with washing machines.

A still further object of the invention is the provision of gearing of this character which is thoroughly reliable and efficient in operation, strong, durable, and inexpensive of manufacture.

Other objects will be in part obvious and in part hereinafter set forth.

The invention accordingly consists in the features of construction, combination of elements and arrangement of parts which will be exemplified in the construction hereinafter described, and the scope of the application of which will be defined in the appended claim.

In the accompanying drawings:

Figure 1 is a side elevation of a washing machine showing the gearing applied thereto constructed in accordance with the invention;

Fig. 2 is a vertical longitudinal sectional view;

Fig. 3 is a bottom plan view;

Fig. 4 is a rear elevation showing the gearing connected with a wringer for operating the same;

Fig. 5 is a top plan view.

Similar reference characters indicate corresponding parts throughout the several views of the drawings.

Referring to the drawings in detail, A designates the tub which is of the usual upwardly tapered form and preferably supported upon legs B fastened thereto in any suitable manner, while at the top of the tub is a swinging cover or lid 10 which is suitably hinged thereto, and on the raising of the same permits access to the interior of the tub.

The gearing, as will now be described, is mounted upon the bottom 11 of the tub so as to be out of the way and comprises a main bed plate 12 formed with a plurality of ears 13 through which are passed suitable fasteners 14 for the securing of the head plate to the bottom 11 of the tub. In this instance the bed plate 12 is spaced from the bottom 11 and carries thereon a bridge plate 15 which is spaced therefrom and parallel therewith. Between the plates 12 and 15 are arranged large and small meshing gears 16 and 17 respectively, which are fixed to shafts 18 journaled in the plates 12 and 15, while fixed to the shaft carrying the small gear 17 is a fly wheel 19 having a belt or pulley flange or rim 20 over which is trained the driving belt 21 operated by a motor 22 preferably of the electric type, although any other type of motor may be employed if desired.

Journaled in the plates 12 and 15 at one side of the small gear 17 is a spindle or shaft 23 which extends upwardly through the bottom 11 of the tub A centrally thereof and has fixed thereto interiorly of the tub an agitator 24 for the successful washing of clothes within the tub of the washing machine. On the shaft 23 is fixed a crank 25 to which is connected a throw link 26, the same being also connected to a crank 27 fixed to the other shaft 18 carrying the large gear 16 so that on the rotation of the gears 16 and 17 by the motor the link 26 connecting the cranks 25 and 27 will reciprocate the shaft 23 and correspondingly the agitator 24 interiorly of the tub of the washing machine.

Mounted on the bottom 11 of the tub A at the desired point is a bearing 28 in which is pivoted a throw lever 29, to which is con-

nected through the medium of a universal joint 30 a link 31 which has at opposite ends a universal joint 32 adapted for detachable connection with the pivot between the link 26 and the crank 25 so that the gearing can be operated by hand if desired and in this event the belt 21 is detached from the flange or rim 20 on the fly wheel 19 so that the motor is dispensed with for power.

Fixed to the top of the tub A is a suitable support 32 having arranged thereon a wringer 33, the shaft 44 for one of the wringer rollers having loosely journaled thereon reversing gears 35 between which is arranged a clutch sleeve 36 which is keyed to said shaft 34 and this sleeve is adapted to be thrown into clutching engagement with either of the gears 35 for the locking of the same to the shaft 34 in any suitable manner. Meshing with the reversing gears 35 is a pinion 37 carried upon a vertical shaft 38 journaled in suitable bearings 39, the lower end of the shaft 38 being fitted with a pinion 40 which meshes with the large gear 16 so that motion from the latter can be imparted to the shaft 34 for operating the wringer.

From the foregoing description, taken in connection with the accompanying drawings, the construction and operation of the herein described washing machine will be readily apparent and, therefore, a more extended explanation has been omitted.

Having thus described my invention, I claim:

A washing machine gearing comprising a bracket support adapted to be fixed to the bottom of the tub and including a plate arranged in spaced parallel relation to and below said tub bottom, an agitator spindle mounted in said plate, intermeshing gears mounted in the bracket above the plate, a power connection for one of the gears, a crank operated by the other of said gears, an arm extending from the spindle, a link connecting said arm and crank to drive the spindle by means of the gears, and a manually operable member adapted for connection with the arm, said arm, link, crank, and manually operable connection being disposed below the plate of the bracket.

In testimony whereof I affix my signature.

JACOB D. SPAUGY.

Witnesses:
H. C. KINERIEM,
H. M. WAIMER.

A. W. ALTORFER.

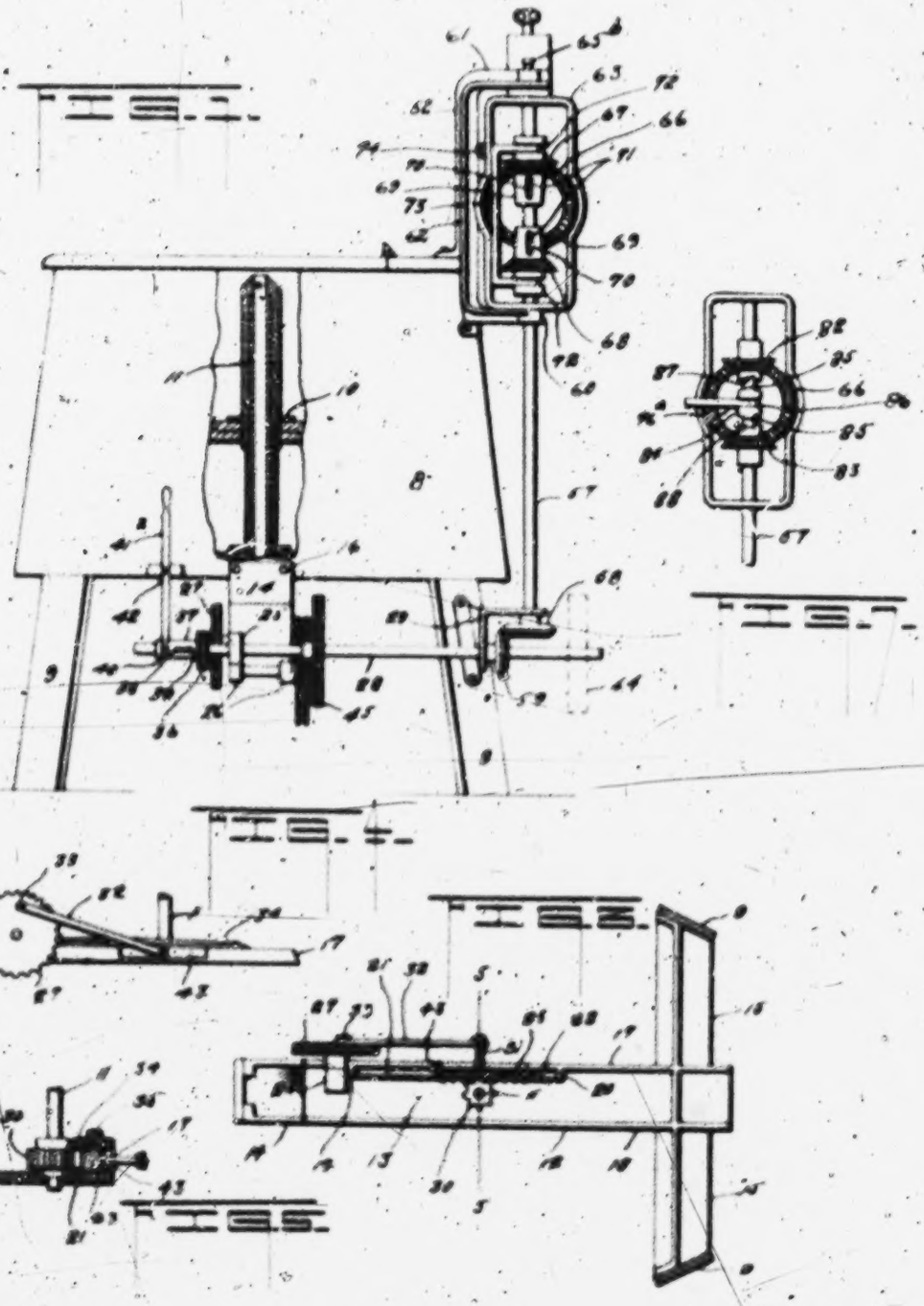
DRIVING MECHANISM.

APPLICATION FILED FEB. 24, 1913.

1,227,733.

Patented May 29, 1917.

2 SHEETS—SHEET 1.



WITNESSES

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By La Porte & Bean

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DRIVING MECHANISM.

APPLICATION FILED FEB. 24, 1913.

1,227,733.

Patented May 29, 1917.

2 SHEETS—SHEET 2.

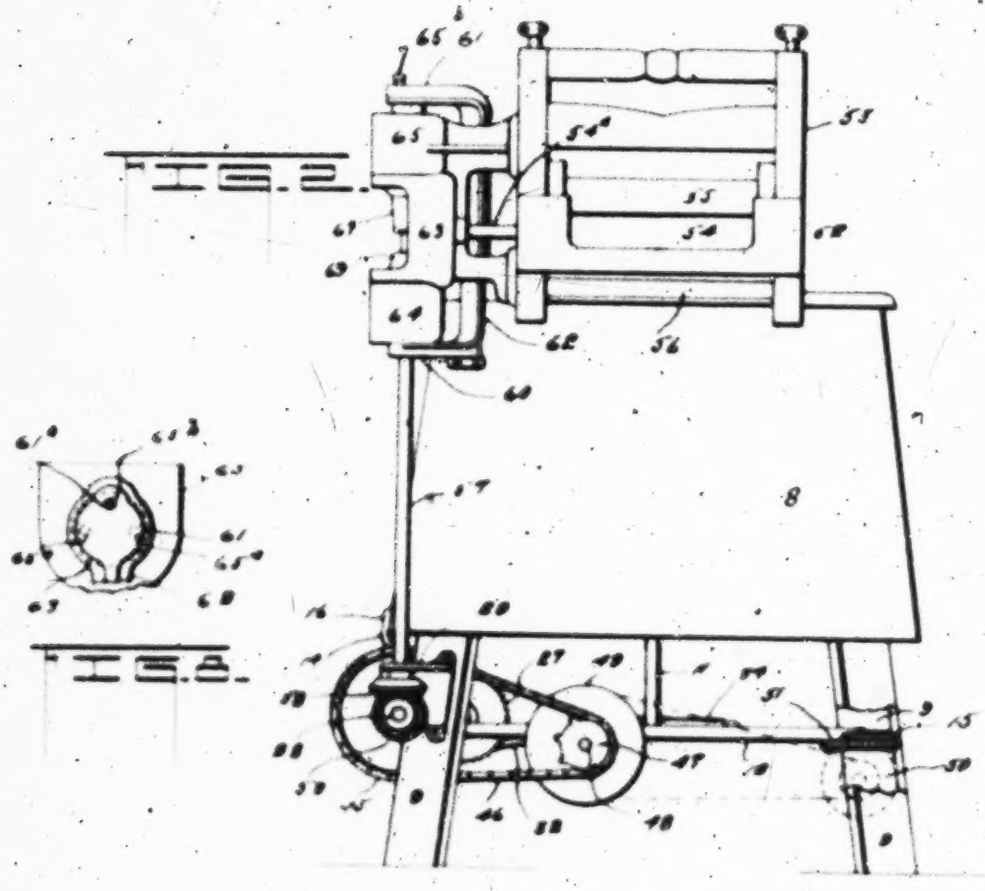

FIG. 2.

FIG. 4.

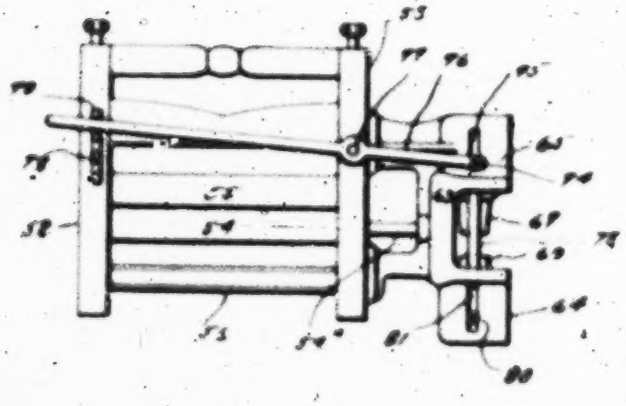

FIG. 5.

Witnesses
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Mildred F. Boman

Inventor
Alphens W. Altorfer
By LaPorte & Bell
Attys

UNITED STATES PATENT OFFICE.

ALPHEUS W. ALTORFER, OF ROANOKE, ILLINOIS, ASSIGNOR TO POWER WASHING MACHINE CO., OF PEORIA, ILLINOIS, A CORPORATION OF ILLINOIS.

DRIVING MECHANISM.

1,227,733. Specification of Letters Patent. Patented May 29, 1917.

Application filed February 24, 1913. Serial No. 750,294.

To all whom it may concern:

Be it known that I, ALPHEUS W. ALTORFER, a citizen of the United States, residing at Roanoke, in the county of Woodford and State of Illinois, have invented certain new and useful Improvements in Driving Mechanisms, of which the following is a specification.

This invention has reference to a driving mechanism for a washing machine and like structures, and includes actuating means for a wringer or similar device associated with said washing machine.

The invention has for its principal object to improve the driving mechanism for washing machines, particularly that type of machine driven by power, such for instance, as a gasolene engine, electric motor or similar power, as distinguished from a "hand-power" machine.

The invention, improvement in the driving mechanism for washing machines, includes an underdrive, being the transmission of motion to the "dolly" of the machine from the underside of the machine, as distinguished from a driving mechanism located or being disposed on the top of the machine.

For a further and full description of the invention herein, and the merits thereof, and also to acquire a knowledge of the details of construction of the means for effecting the result, reference is had to the following description and drawings hereto attached.

While the essential and characteristic features of the invention are susceptible of modification, still the preferred embodiment of the invention is illustrated in the accompanying drawings, in which:—

Figure 1 is an elevation, with parts in section, showing a washing machine with my improved driving mechanism applied thereto, and also showing the actuating means for the wringer;

Fig. 2 is an elevation of the devices shown in Fig. 1, looking at the right hand side of Fig. 1, parts in section;

Fig. 3 is a plan view of a frame for supporting certain parts of the driving mechanism and with parts of the mechanism thereon;

Fig. 4 is a side elevation of the mechanism shown on the frame in Fig. 3;

Fig. 5 is an enlarged sectional detail as the same would appear if taken on the line 5—5 of Fig. 3;

Fig. 6 is an elevation of the wringer mechanism looking at the side, opposite to that shown in Fig. 2;

Fig. 7 shows a modified construction of the gearing for actuating the wringer, and

Fig. 8 is a detail of the means for locking the wringer in adjusted positions.

Like characters of reference denote corresponding parts throughout the figures.

The washing machine is designated 8 and is supported by the legs 9. The "dolly" mechanism 10, which may be of any approved construction, is preferably operated by the vertically disposed shaft 11 extending up through the bottom of the tub of the machine, as best seen in Fig. 1. The lower end of the shaft 11 is suitably journaled in the frame part 12. This frame, includes the horizontally arranged portion 13, the upwardly inclined portion 14 and the oppositely disposed right-angle portions 15. The frame part 12 is secured to the washing machine, by fastening the inclined portion 14 to the lower outside face of the tub, as at 16, see Figs. 1 and 2, and the outer ends of the right-angle portions 15 are secured to the legs 9, see Figs. 2 and 3.

The horizontally arranged portion 13 of the frame part 12 is made in the form of a U-shaped channel bar, see Fig. 5, having the side flanges 17 and 18 and said portion 13 is also provided with the inwardly extended lugs 19 and 20 and also with ribs 21 and 22 spaced from the side flange 17, see Figs. 3 and 5; said flange 17 and said ribs 21 and 22 together, producing a confined passage-way for a rack-bar 23.

On the upper face of the frame part 12 is provided a bearing 24 and on the underside are provided bearings 25 and 26. The bearing 24 receives a shaft to which is connected a gear-wheel 27. The bearing 25 receives a shaft 28, which passes through and has a bearing in a bracket 29, secured to one of the legs 9, see Fig. 1.

The shaft 11 extending up into the washing machine, is operated as follows:—On the lower end of the shaft 11 is carried a pinion 30 and said pinion 30 is in mesh with the rack-bar 23. The rack-bar 23 is provided with a laterally extended pin or stem 31 to which is connected a pitman or reach-

bar 32 and said pitman or reach-bar has a pivotal connection at 33 with the gear-wheel 27. The rack-bar 23 rests and slides on the longitudinal extension 13 of the frame part 12 between the side flanges 17 and the ribs 21 and 22 and is held against upward movement by the plate 34 which overlies the rack-bar and rests upon and is secured to the lugs 19 and 20 of said frame part 12. The plate 34 has a longitudinal groove 35 in its under face to receive a part of the rack-bar 23, serving as an additional guiding means for said rack-bar. The gear-wheel 27 is adapted to be driven from the shaft 28 and this is accomplished by placing on the shaft 28 the slidable pinion 36; said pinion having a hub or sleeve 37, slotted as at 38 into which projects a pin 39 secured in said shaft 28. The hub or sleeve 37 of the pinion 36 is further provided with a grooved portion 40 in which is operatively carried the bifurcated end of a lever 41, which is employed for sliding the sleeve 37 and its pinion 36 on the shaft 28 to place said pinion 36 in meshing relation with said gear-wheel 27 and for moving said pinion out of meshing relation with said gear-wheel 27 and into inoperative position, seen in Fig. 1. The lever 41 is pivoted at 42 to the body of the tub of the machine. It is obvious that when the pinion 36 has been moved into meshing relation with the gear-wheel 27, and if power is applied to the shaft 28 that the gear-wheel 27 will be rotated, reciprocating the pitman or reach-bar 32 and impart an alternate forward and backward movement to the rack-bar 23, which in turn through its connection with the pinion 30 on the shaft 11 will impart an alternate rotary movement to said shaft 11 and the "dolly" mechanism thereon. Moving the pinion 36 out of mesh with the gear-wheel 27 stops the movement of the shaft 11.

The flange 17 of the frame-part 12 is cut away or slotted, as at 43, see Figs. 3, 4 and 5 to provide for the movement of the stem or pin 31 on the rack-bar 23, and when the parts are in operative position, the plate 34 overlies the cut-out portion 43 to guard the stem or pin 31.

The shaft 28 may be operated from any suitable source of power and by any well known means. However I have shown that it may be driven from a gasolene engine or suitable motor, belted to the shaft through a wheel 44, shown in dotted lines in Fig. 1 and secured to said shaft 28, or said shaft may be driven by an electric motor or similar element, as I shall now explain: On the shaft 28 is carried a sprocket wheel 45, connected by a sprocket chain 46 with a sprocket pinion 47 carried by a shaft 48 journaled in the bearings 26 on the underside of the frame-part 12. On said shaft 48 is also carried a wheel 49 and said wheel 49 may be suitably belted to an electric motor 50, shown in dotted lines in Fig. 1 and attached to or suspended from a support 51 for the motor; said support being preferably secured to the underside of the frame part 12.

Associated with the washing machine and driven from the same shaft, as that employed for operating the "dolly" mechanism of the said machine, is a wringer mechanism, designated generally as 52. The wringer mechanism proper, is not unlike any of the standard makes of wringers. That is, it includes the frame 53, the rollers 54 and 55 suitably geared to each other, and the drip board 56. The wringer 53 is swingably supported on the upper end of a vertically disposed shaft 57. The shaft has a bearing at its lower end in the bracket 29 and carries a bevel gear wheel 58 in mesh with and adapted to be driven by a bevel gear wheel 59 carried on said shaft 28. At its upper end the shaft passes through and is journaled in the spaced bearings 60 and 61, being part of a bracket 62 secured to the tub of the machine, in the manner shown in Figs. 1 and 2. To the wringer frame is secured a casting 63 having bearing portions 64 and 65, and said casting and its bearing portions are carried on the shaft 57 between the bearings 60 and 61 of the bracket 62. In this manner the wringer is swingably supported on said shaft 57. The object of swingably supporting the wringer, is to position the wringer in the manner shown in Figs. 1 and 2, so that clothes or materials which have been treated in the washing machine may be readily passed through the wringer and deposited in a tub or rinse water placed alongside the washing machine, when the wringer may be swung away from the washing machine into a position at right angles to that shown, and the clothes and other materials taken from the rinse water and passed through the wringer to be deposited in a basket or receptacle.

To lock the wringer in its adjusted positions I provide the upper part of the bearing 65 of casting 63 with the plurality of openings or holes 65*, see Fig. 8, and adapted to enter said holes is the locking pin 63 carried through an opening 61* in the bearing 61 of the bracket 62.

The wringer actuating means will now be described. The shaft 54* of the wringer roller 54 passes through the frame 53 of the wringer and has a bearing in the casting 63. On the outer end of the shaft 54* is carried a bevel-gear wheel 66 and adapted to be alternately thrown into mesh with said gear-wheel 66, are bevel gear wheels 67 and 68. These last mentioned wheels have extended sleeves 69 slotted as at 70 and pins 71 in the shaft 57 enter said slots. The pins and slots allow the wheels 67 and

68 to be moved up and down on said shaft 57 but limit their movement. However, said wheels 67 and 68 are adapted to be moved simultaneously and are arranged or so spaced that they may have a neutral position with reference to said wheel 66 or one or the other may be moved into meshing relation with said wheel 66 for the purpose of driving said wheel 66 and the wringer-rolls, in opposite directions, as may be desired. The wheels 67 and 68 have grooved hubs 72 engaged by the shifting arms of the movable plate 73. Said plate 73 has a stud 74 which projects through and is movable in a slot 75 in the bearing 65 of the casting 63, to which is connected the end of a lever 76. This lever 76 is pivoted at 77 to the wringer frame 53 and extends across the face of the wringer, see Fig. 6, and its outer end is adapted to engage in notches 78 in a plate 79 secured to the wringer frame, for locking or holding the lever in adjusted position. To guide the movement of the lower end of the plate 73, said plate has a lug 80, see Fig. 6, movable in a slot 81 in the bearing 64 of the casting 63.

In Fig. 7 I show a modified construction of the gearing for actuating the wringer rolls. The shaft 57, the shaft 54ª and the gear-wheel 66 are the same, but instead of using gears 67 and 68 which are slidable on the shaft 57, I employ bevel gear wheels 82 and 83 which are loose on the shaft 57 and in constant mesh with the gear wheel 66 and interposed between said wheels 82 and 83 is a clutch member 84 which is feathered on the shaft 57 and having clutch faces 85 and 86 adapted to be alternately moved into clutch relation with clutch faces 87 and 88 on the respective wheels 82 and 83. The clutch member 84 is adapted to be shifted by the lever 76, which in this instance has a yoke 76ª engaging in an annular groove 89 in said clutch member 84.

What I claim is:—

1. In a driving mechanism, in combination, a machine, an operating shaft disposed vertically and centrally of said machine, a pinion on the lower end of said shaft, a rack-bar in mesh with said pinion, a driving shaft, a gear wheel slidably keyed on said shaft, a second gear wheel with which said gear wheel on the driving shaft may be moved into and out of meshing relation, and a pitman connected at one end with said second gear wheel and having its opposite end connected with said rack-bar.

2. In a driving mechanism, in combination, a machine, an operating shaft disposed vertically and centrally of said machine, a pinion on the lower end of said shaft, a rack-bar in mesh with said pinion, a driving shaft, a gear wheel slidably keyed on said shaft, a lever for moving said gear wheel, a second shaft, a gear wheel thereon with which said gear wheel on the driving shaft may be moved into and out of meshing relation, and a pitman connected at one end with said second gear wheel and having its opposite end connected with said rack-bar.

3. In a driving mechanism, in combination, a machine, an operating shaft disposed vertically and centrally of said machine, a pinion on the lower end of said shaft, a rack-bar in mesh with said pinion, a driving shaft, a gear wheel slidably keyed on said shaft, a second gear wheel with which said gear wheel on the driving shaft may be moved into and out of meshing relation, a pitman connected at one end with said second gear wheel and having its opposite end connected with said rack-bar, and operating connections for said driving shaft, including a sprocket wheel on the driving shaft, a sprocket pinion and a sprocket chain connection between said sprocket wheel and said sprocket pinion, and means for operating said sprocket pinion.

4. In a driving mechanism, in combination, a machine, an operating shaft vertically arranged in said machine, a gear wheel on the lower end of said shaft, a driving shaft, a gear wheel slidably keyed on said shaft, and having a grooved hub, a lever pivoted on said machine and engaging in the groove of the hub of said gear wheel, a second shaft, a gear wheel on said second shaft with which the gear wheel on the driving shaft may be moved into and out of meshing relation, a rack-bar meshing in said gear wheel on the operating shaft, a pitman connected at one end with said second gear wheel and having its opposite end connected with said rack-bar, and a guiding support for said rack-bar.

5. In a driving mechanism, in combination, a machine body, legs supporting said machine body, a frame support comprising a main portion and extensions therefrom, one end of said main portion secured to said machine body and said extensions secured to certain of said legs, an operating shaft journaled through the bottom of said machine body and its lower end having a bearing in said main portion of said frame support, a driving shaft, and mechanism for operating said operating shaft from said driving shaft, said mechanism including a shiftable element for cutting said mechanism out of operating relation with said driving shaft.

6. In a driving mechanism, in combination, a machine body, legs supporting said machine body, a frame support comprising a main portion and extensions therefrom, one end of said main portion secured to said machine body and said extensions secured to certain of said legs, an operating shaft journaled through the bottom of said machine body and its lower

end having a bearing in said main portion of said frame support, a gear wheel on the lower end of said operating shaft, a rack-bar slidable on said frame support and meshing in said gear wheel, guiding means on the frame support for holding the rack-bar in operative relation with said gear wheel and guiding said rack-bar in its movement, a driving shaft and means for reciprocating said rack-bar from said driving shaft.

7. In a driving mechanism, in combination, a machine body, legs supporting said machine body, a frame support comprising a main portion and extensions therefrom, one end of said main portion secured to said machine body and said extensions secured to certain of said legs, an operating shaft journaled through the bottom of said machine body and its lower end having a bearing in said main portion of said frame support, a gear wheel on the lower end of said operating shaft, a rack-bar slidable on said frame support and meshing in said gear wheel, guiding means on the frame support for holding the rack-bar in operative relation with said gear wheel and guiding said rack-bar in its movement, a driving shaft, a gear wheel slidably keyed on said driving shaft, a second gear wheel with which the gear wheel on the driving shaft may be moved into and out of operative relation, and a pitman connection between said second gear wheel and said rack-bar.

8. In combination, a machine body, legs supporting said machine body, a frame support comprising a main portion and extensions therefrom, one end of said main portion secured to said machine body and said extensions secured to certain of said legs, said main portion of said support having a side flange cut away for a portion of its length and also having spaced ribs producing a confined guide-way for a rack-bar, a rack-bar movable in said confined guide-way and having a stem operable through the cut away portion of said flange, means for holding the rack-bar against raising during its reciprocatory movement, a shaft journaled in said main portion of said support, a gear wheel on said shaft in mesh with said rack-bar, a pitman bar connected to the stem of said rack-bar, and rotary means for operating said pitman bar.

In testimony whereof I affix my signature, in presence of two witnesses.

ALPHEUS W. ALTORFER.

Witnesses:
MILDRED F. BOMAN,
PEARL M. COPELAND.

918

G. L. DAVIS.

AGITATOR FOR WASHING MACHINES.

APPLICATION FILED FEB. 29, 1916.

1,240,826. **Patented Sept. 25, 1917.**

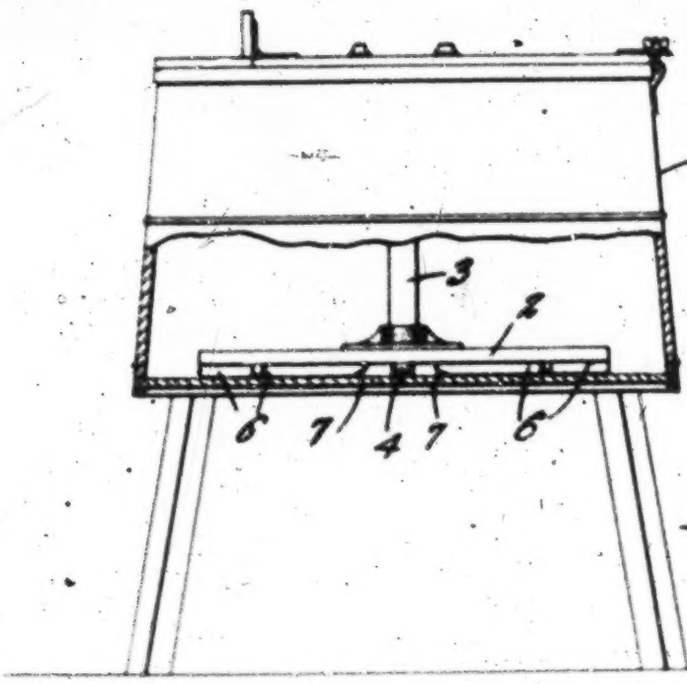

Fig. 1.

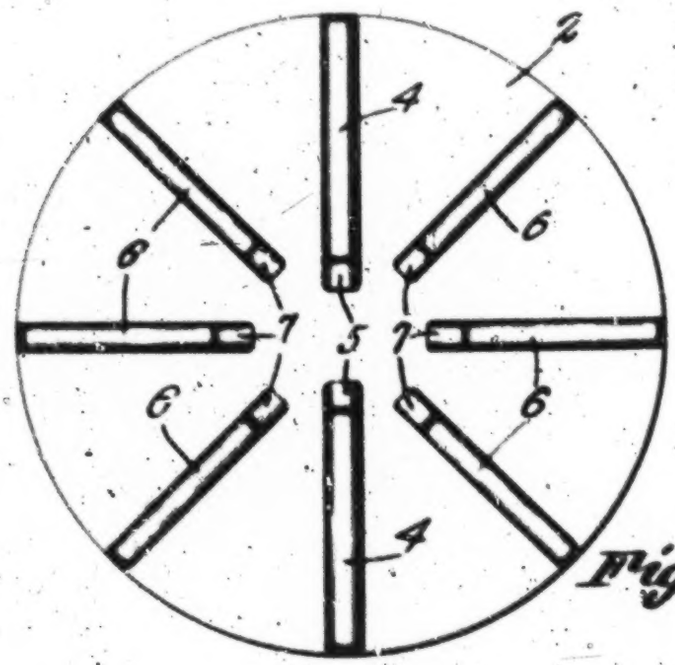

Fig. 2.

Witnesses

M. L. Fowler

H. L. Parker

G. L. Davis, Inventor

by *C. A. Snow & Co.*

Attorneys

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UNITED STATES PATENT OFFICE.

GEORGE L. DAVIS, OF BINGHAMTON, NEW YORK.

AGITATOR FOR WASHING-MACHINES.

,240,826. Specification of Letters Patent. Patented Sept. 25, 1917.

Application filed February 29, 1916. Serial No. 81,200.

all whom it may concern:

Be it known that I, GEORGE L. DAVIS, a tizen of the United States, residing at inghamton, in the county of Broome and ate of New York, have invented a new and eful Agitator for Washing-Machines, of hich the following is a specification.

This invention relates to agitators for shing machines, the same being of the disk pe designed for rotation back and forth thin the tub of a washing machine.

One of the objects of the invention is to ovide an agitator having a novel arrangeent of ribs or vanes on the lower or active ce thereof and which operate to direct the ater outwardly by centrifugal force, there- setting up a circulation downwardly ithin the tub adjacent the wall thereof, d thence upwardly through the fabrics in e tub and to the center of the space below s agitator.

A further object is to provide an agitator signed to float upon the water contained ithin the tub and the ribs on which will t only serve to set up a circulation of wa- r as stated, but will also rub lightly upon e fabrics without danger of injuring them.

A still further object of my invention is provide means in connection with the itator disk to prevent churning of the shing fluid, and other means also in conction with said disk to cause the fluid flow es to substantially conform to the shape an elongated loop depressed intermediate ends.

With the foregoing and other objects in w which will appear as the description roceeds, the invention resides in the comnation and arrangement of parts and in e details of construction hereinafter deribed and claimed, it being understood that anges in the precise embodiment of the inntion herein disclosed, can be made with- the scope of what is claimed, without departing from the spirit of the invention.

In the accompanying drawings the prerred form of the invention has been shown.

In said drawings:—

Figure 1 is a view partly in side elevation d partly in section of a washing machine aving the present improvements combined erewith.

Fig. 2 is a bottom plan view of the agitor.

Referring to the figures by characters of ference 1 designates a tub of the inverted type (of greater diameter at the bottom than at the top), and arranged within the tub so as to rotate backwardly and forwardly is a disk 2 which can be driven in any manner desired, as by means of a shaft 3 connected to a suitable motor, not shown. This disk is provided on its lower or active face with opposed alining ribs 4 having their inner ends beveled as at 5, while their outer ends are substantially flush with the margin of the disk 2. Arranged at opposed sides of the ribs 4 and groups of radiating ribs 6 regularly spaced and having their inner ends beveled as at 7 while their outer ends are substantially flush with the margin of the disk 2. The inner ends of these ribs 6 are arranged in the arc of a circle, while the opposed ribs 4 extend inwardly closer to the center of the disk and are somewhat wider than the ribs 6. Thus the inner ends of the ribs 4 act as blades for engaging liquid contained within the circle defined by the inner ends of the ribs 6. Because of this peculiar arrangement of ribs 4 and 6, the fluid is caused to flow in lines similar in shape to an elongated loop depressed intermediate its extremities. The constancy of such flow lines eliminates eddies and other current irregularities preventive of a high degree of efficiency. It will be apparent that all of the spaces formed between the ribs on the disk communicate adjacent the center of the disk between the inner ends of the ribs, and that the lower face of the disk is flat and free of obstructions or projections other than the ribs. The beveled inner terminals of ribs 4 and 6 indicate the substantial configuration of an inverted bowl presenting no acute obstructions to the fluid flow lines consequent of rib depression and centrifugal force.

In using the agitator the tub is partly filled with water, after which the disk 2 is placed above the fabrics in the tub so as to float upon the water. The disk is then rotated backwardly and forwardly and during this movement the ribs 4 and 6 will have two functions. First they will throw the upper portion of the water by centrifugal force toward the wall of the tub, thus creating a suction under the center of the disk, with the result that the water displaced upwardly by this suction will force its way through the fabrics and will create a circulation inwardly adjacent the bottom of the tub and downwardly adjacent the wall thereof.

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Thus the fabrics will be thoroughly cleaned without being pulled and distorted, the circulation of the water through the fabrics resulting in the removal of the dirt therefrom. In addition to the foregoing the ribs will act as rubbing elements inasmuch as they will engage lightly with the fabrics thereunder.

As has heretofore been pointed out, importance is attached to the particular construction and arrangement of the ribs on the disk. With this arrangement the shorter ribs 6 operate to throw the water outwardly by centrifugal force, creating a suction into the central space between the inner ends of the ribs. The water brought into this central space is engaged and thrown outwardly by the inner ends of the ribs 4 so that the centrifugal action of the agitator is materially increased by this particular arrangement.

What is claimed is:—

In a washing machine the combination with a tub, of an agitating disk mounted to float on water in the tub, radial vanes upon the lower face of the disk adapted, when the disk is rotated, to direct the upper portion of the water outwardly by centrifugal force toward the wall of the tub and to draw water upwardly from the center of the bottom thereof; and a driving shaft for actuating the disk, said disk being freely movable vertically.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

GEORGE L. DAVIS.

Witnesses:
ORD A. BRAZIL,
A. B. SMITH.

P. F. SCHNEIDER.

WASHING MACHINE.

APPLICATION FILED NOV. 26, 1915.

1,253,536.

Patented Jan. 15, 1918.

2 SHEETS—SHEET 1.

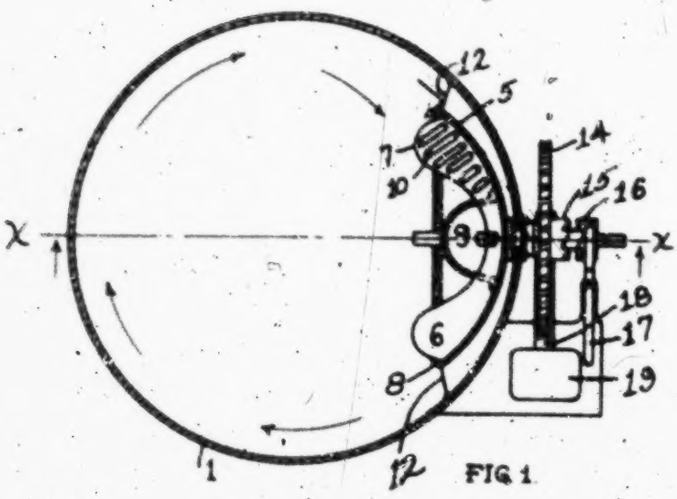

FIG 1

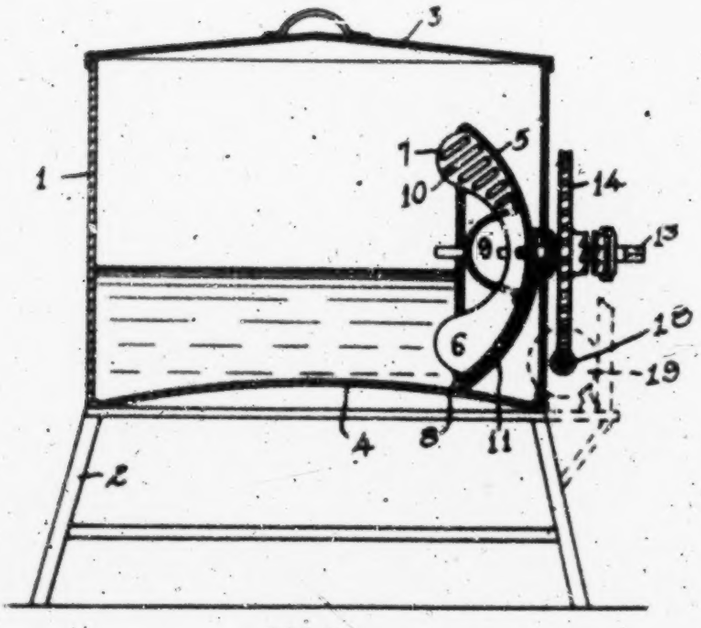

FIG 2

Inventor

PETER F. SCHNEIDER

Witness

Emma B. Kleiner

By Charles E. Kleiner

Attorney

P. F. SCHNEIDER.

WASHING MACHINE.

APPLICATION FILED NOV. 28, 1913.

1,253,536.

Patented Jan. 15, 1918.

2 SHEETS—SHEET 2.

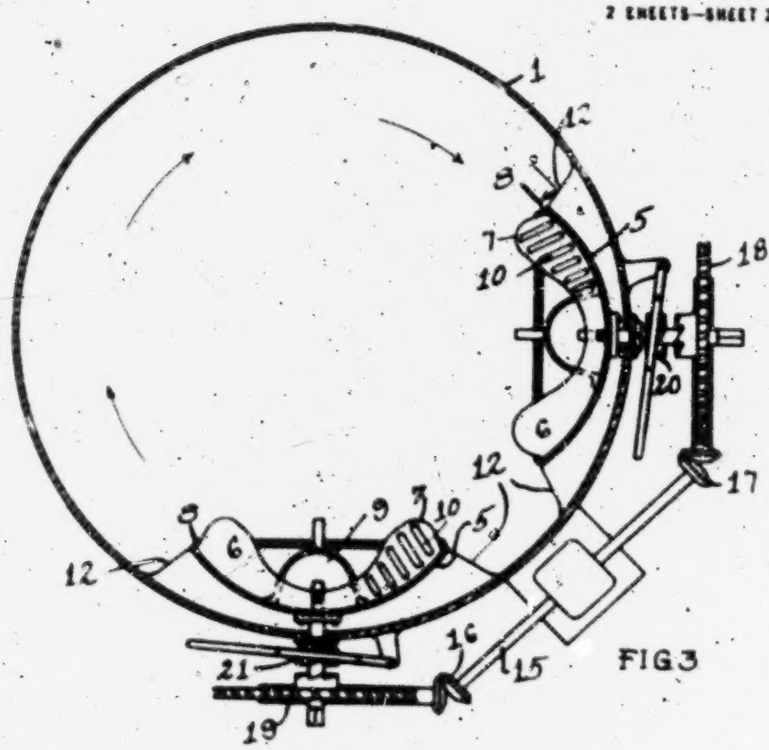

FIG 3

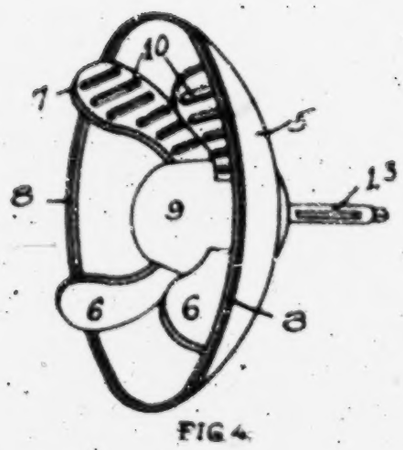

FIG 4

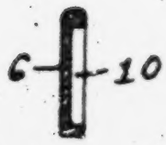

FIG 5

Witness
Emma Bloom

Inventor
PETER F SCHNEIDER

By Charles E Hann

Attorney

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UNITED STATES PATENT OFFICE.

PETER F. SCHNEIDER, OF DETROIT, MICHIGAN.

WASHING-MACHINE.

1,253,536. Specification of Letters Patent. Patented Jan. 15, 1918.

Application filed November 26, 1915. Serial No. 63,412.

To all whom it may concern:

Be it known that I, PETER F. SCHNEIDER, a citizen of the United States, residing at Detroit, county of Wayne, State of Michigan, have invented a certain new and useful Improvement in Washing-Machines, and declare the following to be a full, clear, and exact description of the same, such as will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

This invention relates to clothes washing machines and the primary object of the invention is a device for the purpose in which the clothes are continuously agitated and circulated in the water to and from an agitating wheel operating in the reservoir, which acts as a beater and tends to force the water through the fabric. In the usual machine having an agitating wheel provided with paddles or the like which engage the clothing during its operation, the said clothing becomes twisted into a rope like formation making it difficult indeed to separate the various articles in the reservoir after being washed. An object of this invention is an agitating wheel having paddles adapted to engage the articles being washed and so constructed as to prevent the twisting of the articles during the washing operation. A further object of the invention resides in the form of the receptacle and relative position of the agitating wheel therein, whereby a whirling motion of the water is set up during operation of the agitating wheel producing a travel of the articles of clothing from and toward the wheel so that all articles being washed come into engagement with the wheel, the wheel being so arranged as to pick up a quantity of water which serves to disengage the clothing from the paddle wheels. A further object of the invention is an agitating wheel provided with pockets adapted to pick up and discharge water during revolution of the wheel thereof, and a further object is an agitating wheel of the character stated having a dome like central projection adapted to prevent the clothing from engaging the paddles at a central point of intersection. These and other objects and the several novel features of construction by which they may be attained are hereinafter more fully described and claimed and disclosed in the embodiment of the invention shown in the accompanying drawing in which—

Figure 1 is a horizontal section of a washing machine embodying my invention.

Fig. 2 is a vertical section thereof on line *x*—*x* of Fig. 1.

Fig. 3 is horizontal section of a larger type of machine utilizing more than one agitating wheel.

Fig. 4 is a detail in perspective of one of the agitating wheels.

Fig. 5 is a cross-section of one of the paddles showing the pocket formed in the side thereof.

Similar characters refer to similar parts throughout the drawing and specification.

In its preferred form the device consists of a cylindrical tub or reservoir 1, carried on a framework 2 and arranged with its longitudinal axis in a vertical plane as shown particularly in Fig. 2. The cover 3 of any approved type may be utilized for the upper end thereof and the bottom 4 may be concaved from the bottom, as is indicated in said figure if so desired. An agitating wheel 5 is provided at one side of the reservoir preferably formed of sheet metal having the general form of a frustum of a hollow sphere. The radius of the said wheel is preferably less than the radius of the reservoir as is shown particularly in Fig. 1, and on the inside of this frustum are secured the paddles 6 there being preferably four of such paddles formed by two centrally intersecting parts crossing at a right angle. The rounded ends of the paddles as indicated at 7 project beyond the metal base or back 5 and the edge 8 of the metal part for a short distance is turned over the ends of the paddle wheels forming a cylindrical ring which has an additional function hereinafter described. About the center of the agitating wheel is a rounded or dome shaped sheet metal part 9 extending outward from the base 5 as indicated. This rounded part 9 prevents the clothing from entering the center of the wheel and being rounded as shown the clothing readily slides off from the surface thereof. By reason of the movement of the water in the receptacle the clothing is drawn toward and into the wheel and a greater or less amount is lifted by the paddles during their revolution, and which paddles also lift a considerable amount of water due to the form of the agi-

tating wheel, which pockets the water between the paddles, and this water runs down onto the dome shaped part 9 tending to wash the clothing away from the wheel at the center. This action of the water is important in that it prevents the clothes from being wound up in the paddle wheel and also enables the water to wash through the fabric tending to clean the same, and the movement of the articles through the water in the reservoir, which is in the direction indicated by the arrows in Fig. 1, also tends to force the water through the fabric, and the water holding a soap solution or other chemical adapted to cleanse the fabric, movement of the water through the fabric in the general manner mentioned tends to thoroughly clean it. In order that the blades of paddle members 6 may carry a maximum amount of water the one face of the blade is provided with grooves or pockets 10 on the side which contacts the water in its revolution, and in passing out of the water carry a quantity of the same therewith. This water in the pockets tends to loosen such fabrics as may hang on the paddle member and also adds to the quantity of water which otherwise naturally flows through the fabric. To prevent the clothes passing behind the paddle wheel at the bottom a shield 11 is provided preferably formed of sheet metal occupying the space between the paddle wheel and the tub and having a substantially vertical straight or curved face 12 at an angle to the paddle wheel 5. The purpose of this vertical face is to prevent the clothing from passing behind the paddle wheel and to deflect the clothing outwardly into the paddle wheel as may be readily understood from the drawings.

The agitating wheel is provided with a shaft 13 attached to the back thereof and extending through a bearing provided in the side of the receptacle. The end of this shaft may be squared as indicated in Figs. 1 and 2, and a crank applied to the same for turning the wheel by hand when desired. It is also desirable to operate the agitating wheel by power. For this purpose a worm wheel 14, which is loose on the shaft 13, is provided with one member 15 of a jaw clutch, the opposite member 16 of which is splined to the shaft and adapted to be operated by a lever 17. The worm wheel is driven by a worm 18 as indicated in Fig. 2, on the shaft of an electric motor 19. By this arrangement, when the clutch 16 is withdrawn from its companion 15, the agitating wheel may be operated by hand or, by bringing the two clutch members into engagement, power may be applied thereto.

Under rapid rotation of the agitating wheel water which is picked up by the blades or paddles tends to fly out of the agitating wheel on the curved surface of the back or base 5. To prevent this the flange 8 is provided tending to keep the water within the receptacle and to discharge the same through the clothes that may hang on the ends of the blades and force them off therefrom.

In Fig. 3, I have shown a receptacle greater in size than that of Fig. 1, in which two similar agitating wheels may be used, each of which is similar to the agitating wheel shown and described in Fig. 1. The two wheels, however, should be rotated in the same direction to produce the desired whirling motion of the water indicated by the arrows in Fig. 3. The clothes passing off from one wheel being drawn into the next wheel by reason of the movement of the water. To operate these wheels in conjunction and in the proper direction of travel the motor shaft 13 is provided with a bevel gear 16 and 17 on opposite ends thereof meshing with similar bevel wheels on the shaft of a worm which is positioned directly beneath the worm wheels 18 and 19 respectively on the two shafts for the agitating wheels. As in the former instance these worm wheels are loose on the shaft and by means of the clutch mechanism indicated at 20 and 21 either or both wheels may be made to drive the respective agitating wheels. By this arrangement of duplicate agitating wheels which may be of any desired number by proper arrangement of mechanism large batches of clothing may be quickly and thoroughly washed as readily as smaller batches with the single agitating wheel heretofore described.

Various alterations may be made in the matter of driving mechanism and of the material of which the parts are formed without departing from the spirit of this invention.

What I claim and desire to secure by Letters Patent of the United States is—

1. In a washing machine, a tub cylindrical in form with the longitudinal axis thereof in vertical position, an agitating wheel having the general form of a frustum of a hollow sphere provided with paddles, and means for rotating the wheel.

2. In a washing machine, a tub cylindrical in form with the longitudinal axis thereof extending in vertical direction, an agitating wheel having the general form of a frustum of a hollow sphere provided with paddles in the concave side thereof, the radius of the frustum, being less than the radius of the tub, and a baffle provided at the lower side of the wheel and extending each way therefrom to the wall of the tub adapted to prevent the clothes from passing behind the wheel.

3. In a washing machine, an agitating wheel having the general form of a frustum of a hollow sphere, blades secured in the inner hollow face thereof forming pockets be-

tween the blades adapted to pick up a quantity of water in the tub, and a dome shaped central portion over which the water flows from the pockets by gravity whereby the clothes being washed are forced away from the center of the wheel.

4. In a washing machine, an agitating wheel having a sheet metal base of the general form of a frustum of a hollow sphere, and blades secured thereto providing pockets by means of which a body of water is lifted during revolution of the wheel and discharged by gravity and centrifugal force of the revolving wheel.

5. In a washing machine, an agitating wheel having a sheet metal base of the general form of a frustum of a hollow sphere, the edge thereof being turned to provide a narrow cylindrical portion, blades secured in the inner surface of the sheet metal base having parts extending beyond the plane of the cylindrical part, a dome shaped portion extending outwardly from the center of the inside of the base over which water flows by gravity from the pockets between each of the blades, said cylindrical portion providing a means guiding the water thrown outwardly by centrifugal force in a direction substantially parallel with the axis of revolution.

6. In a washing machine, a circular tub, an agitating wheel having a concave base shorter in radius than the radius of the tub, and a shield occupying the space between the wheel and the tub, said shield having a substantially vertical face at an angle to the wheel adjacent the edge adapted to deflect the water and clothing into the wheel when the machine is in operation.

In testimony whereof I sign this specification.

PETER F. SCHNEIDER.

F. RITZ AND J. H. BROOK.

WASHING MACHINE.

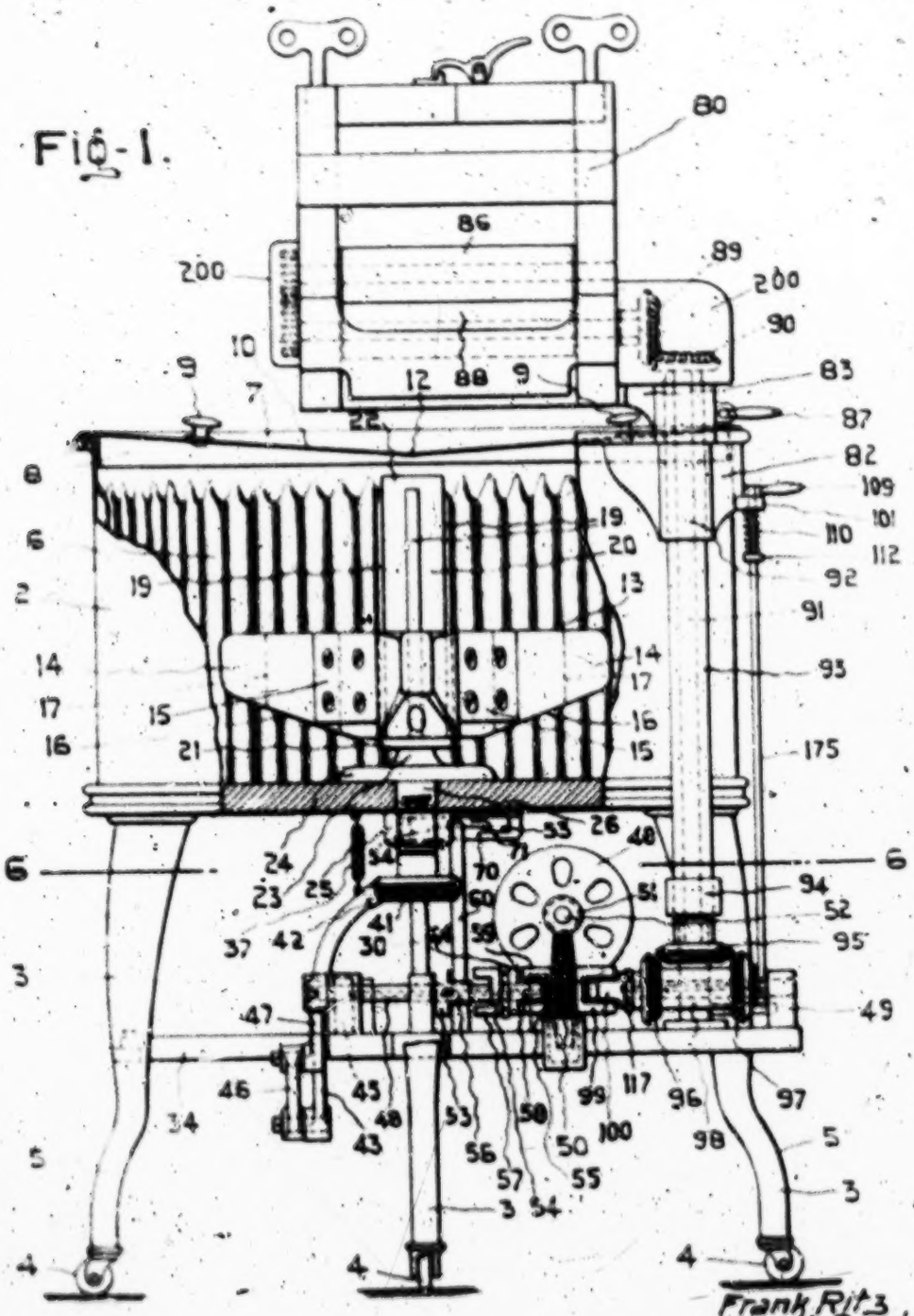
APPLICATION FILED JAN. 27, 1920.

1,393,969.

Patented Oct. 18, 1921.

3 SHEETS—SHEET 1.

Fig. 1.



Frank Ritz
John H. Brook
Inventor

Attorney

F. RITZ AND J. H. BROOK.

WASHING MACHINE.

APPLICATION FILED JAN. 27, 1920.

1,393,969.

Patented Oct. 18, 1921

3 SHEETS—SHEET 2

Fig. 2.

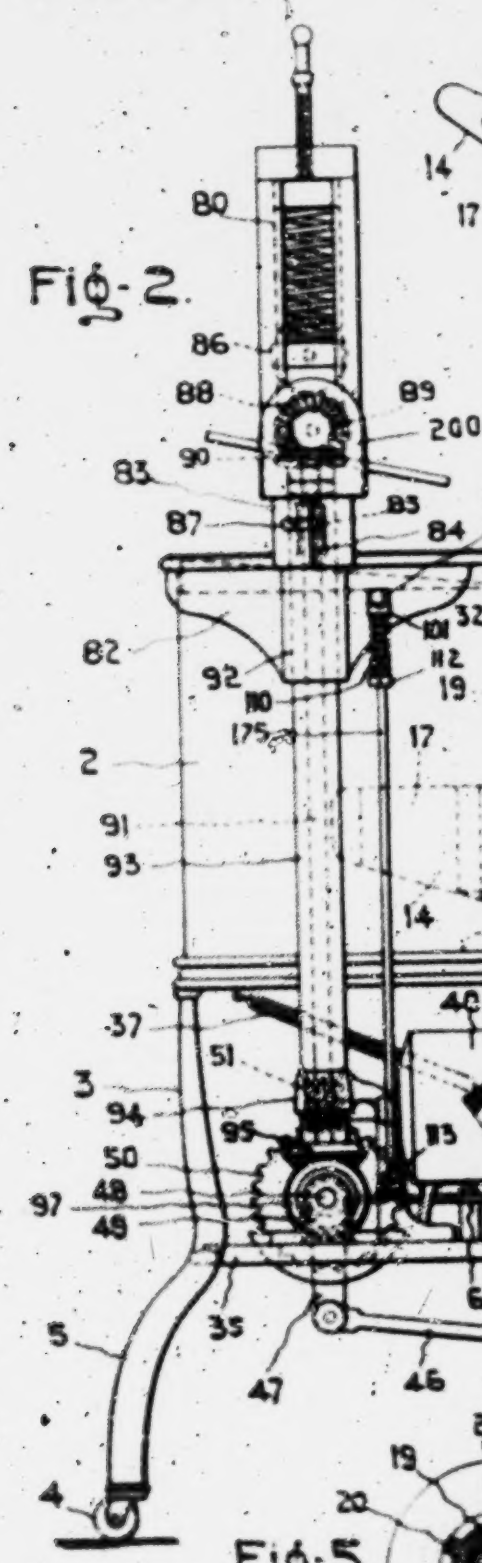


Fig. 3.

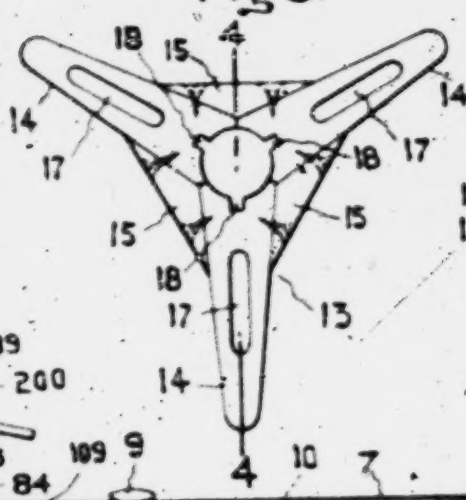


Fig. 4.

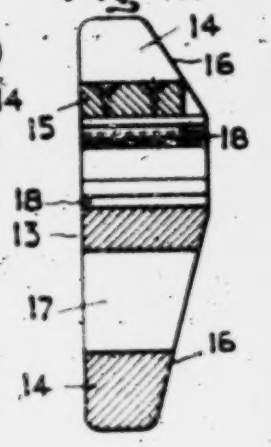
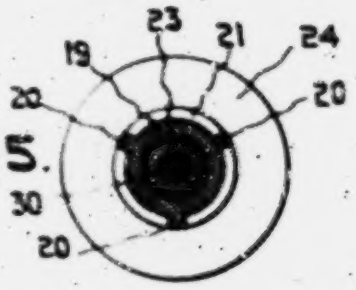


Fig. 5.



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F. RITZ AND J. H. BROOK.

WASHING MACHINE.

APPLICATION FILED JAN. 27, 1920.

1,393,969.

Patented Oct. 18, 1921.

3 SHEETS-SHEET 1.

Fig. 6.

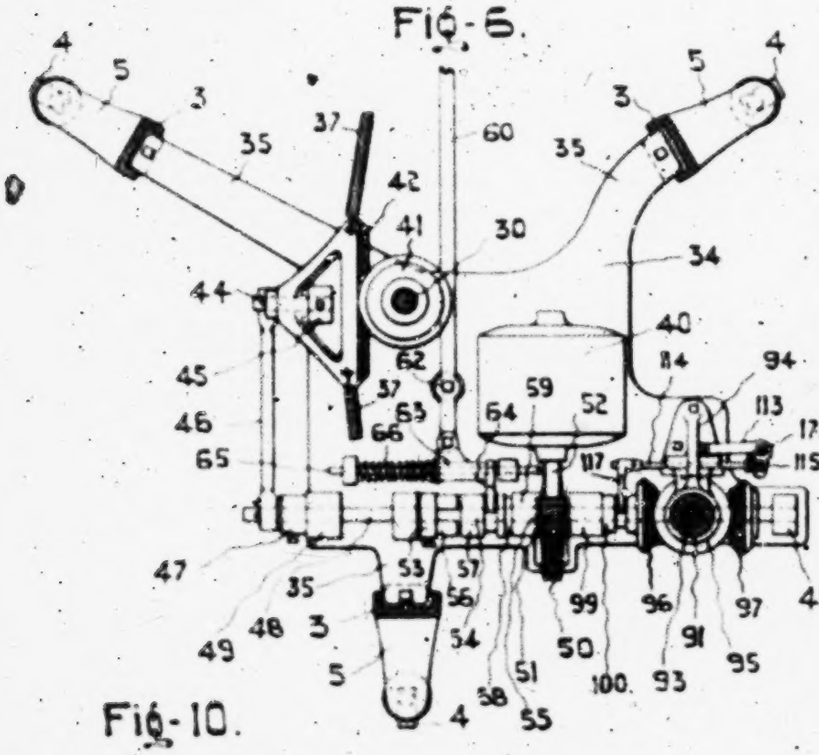


Fig. 7.

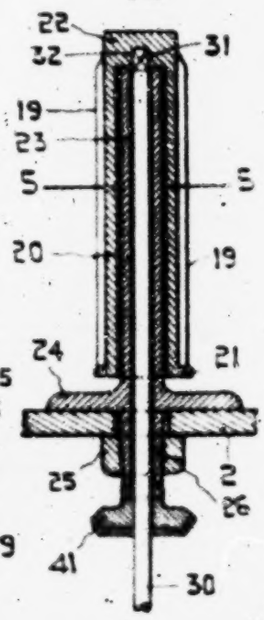


Fig. 10.

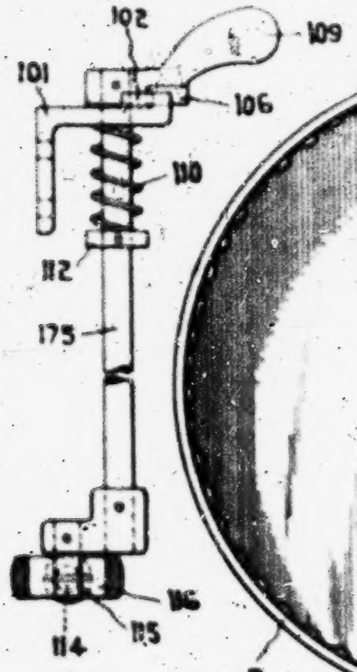


Fig. 8.

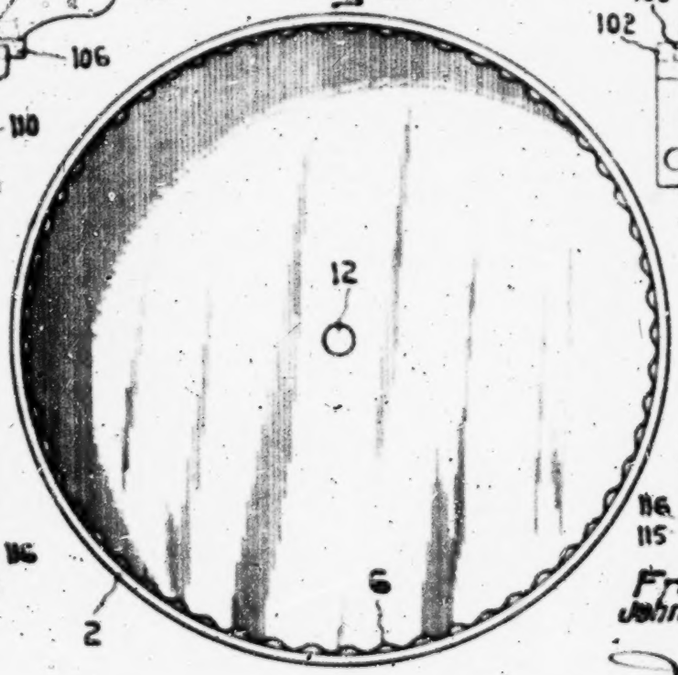
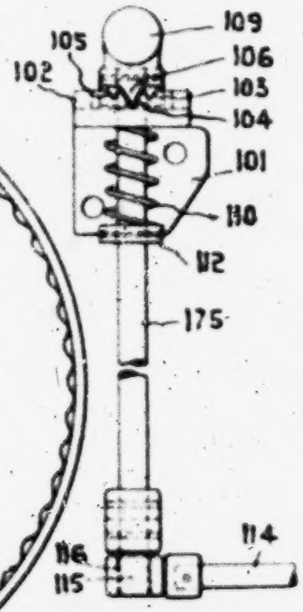


Fig. 9.



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John H. Brook
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UNITED STATES PATENT OFFICE.

FRANK RITZ AND JOHN H. BROOK, OF TORONTO, ONTARIO, CANADA, ASSIGNORS TO THE SUN ELECTRO WORKS, OF TORONTO, CANADA.

WASHING-MACHINE.

1,393,969. Specification of Letters Patent. Patented Oct. 18, 1921.

Application filed January 27, 1920. Serial No. 354,371.

To all whom it may concern:

Be it known that FRANK RITZ and JOHN H. BROOK, both subjects of the King of Great Britain, and residents of the city of Toronto, Province of Ontario, Dominion of Canada, have invented certain new and useful Improvements in Washing-Machines; and we do hereby declare that the following is a full, clear, and exact description of the same.

Our invention relates particularly to electrically driven washing machines and has for its object to provide a machine in which a maximum agitation of the clothes will be obtained without subjecting them to the wear and tear experienced in the majority of washing machines in use at the present time. This maximum agitation of the clothes enables them to be thoroughly washed in a very short time. A further object is to provide a simplified driving mechanism for the washing and wringing mechanisms and which will be automatically disconnected from the wringing mechanism if the latter should become jammed, thereby eliminating the possibility of the motor being burnt out.

To this end our invention consists of the particular construction and arrangement of parts hereinafter described and pointed out in the claims.

For full comprehension, however, of our invention, reference must be had to the accompanying drawings in which similar reference characters indicate the same parts, and wherein:

Figure 1 is a side elevation, partly in section, of a washing machine constructed according to our invention;

Fig. 2 is a similar view and taken at right angles to Fig. 1;

Fig. 3 is a detail plan view of the clothes agitator removed;

Fig. 4 is a sectional view taken on line 4—4 Fig. 3;

Fig. 5 is a sectional view taken on line 5—5 Fig. 7;

Fig. 6 is a sectional view taken on line 6—6 Fig. 1;

Fig. 7 is a vertical sectional view of the power transmission device;

Fig. 8 is a plan view of the tub with the top removed; and

Figs. 9 and 10 are detail views of the manually operated device for operating the wringer.

The embodiment of our invention illustrated in the accompanying drawings comprises a tub containing an oscillatory agitator, an electric motor, wringing mechanism, and power transmission, and mechanisms operatively connecting the agitator and wringing mechanism with the motor.

The tub 2 is stationary and if desired may be permanently connected to the water supply pipe line in substitution for the stationary tubs which are in common use at the present time or it may be made portable by mounting it upon legs 3 having rollers 4 at their lower ends, such lower ends being offset as at 5 for stability. The tub presents a smooth exterior surface while a vertically corrugated lining 6 is mounted on the inner face of its surrounding wall, the corrugations extending from the bottom to within close proximity of the top thereof and being adapted to cooperate with the agitator in washing the clothes. A cover 7 having a circumferential flange 8 and handles 9 is adapted to close the tub and it is slightly concaved as at 10 and provided with a hole 12 in its center to cause the water which is wrung from the clothes to run into the tub.

The agitator consists of a propeller member 13 disposed on a vertical axis and capable of both oscillatory and axial movement. It comprises preferably three radially disposed tapered blades 14 with intermediate members 15. The underside of each blade is upwardly and outwardly inclined as at 16 and is vertically slotted as at 17, the inclined surfaces giving to the clothes being washed a tendency to move outwardly against the corrugated wall and the slots assisting in the agitation of the water.

In order that the agitator may be removed and inserted at will its bore is provided with preferably three feather-ways 18 with which longitudinal feathers 19 on a power-transmission sleeve 20 register the lower ends of the feathers terminating in a circumferential bead 21 which limits downward movement of the agitator. The sleeve is vertically disposed and located in the center of the tub and extends substantially from the bottom to the top thereof. Its upper end 22 is closed and it incloses with a sliding fit a hollow standard 23 the base 24 of which is of increased diameter and is clamped upon the tub bottom by a nut 25 screwed on a short downward extension 26 passing through the

bottom. A shaft 30 passes up through the bore of the standard and its upper end 31 is squared and projects into a squared socket 32 in the closed end 22 of the sleeve. The lower end of the shaft is journaled in a boss 33 formed integrally with a platform 34 supported by lugs 35 on the legs 3. This platform also supports the motor 40 and the transmission mechanism effecting an operative connection between it and the shaft 30.

This operative connection consists of a bevel gear 41 rigidly mounted upon shaft 30 adjacent the downward extension 26, this gear intermeshes with a segmental gear 42 the lower end of which terminates in an arm 43 and is fulcrumed as at 44 in a lug 45 on the platform; oppositely disposed helical springs 37 having their opposite ends connected to the underside of the tub and the segmental gear offer a yielding resistance to movement of the latter in both directions. The arm 43 is operatively connected by a link 46 to a crank arm 47 keyed to a horizontal shaft 48 journaled in bearings 49 on the platform.

Mounted upon this shaft substantially midway the length of the same and rotatable relatively thereto is a comparatively large worm-wheel 50, in intermeshing relation with a worm 51 on the shaft 52 of the motor.

To avoid the necessity of driving both agitator and wringer simultaneously clutch mechanisms are provided to effect the operative connections. The clutch which effects connection between the worm wheel 50 and shaft 48 consists of three members 53, 54 and 55. The member 53 is a collar keyed to shaft 48 and presents a pair of fixed jaws 56 for engagement with a pair of jaws 57 on the intermediate member 54 which is movable relatively to the other members. This movable member is also a collar and has a second pair of jaws 58 which are adapted to engage jaws 59 on the third member 55. The latter is fixed against axial movement although rotatable relatively to the shaft 48 and it is secured to one side of the worm wheel 50 to rotate in unison therewith.

The relatively fixed clutch members 53 and 55 are spaced a sufficient distance apart to enable the intermediate clutch collar 54 to be moved out of engagement with the clutch member 53. The means for shifting the movable clutch member consists of a controlling lever 60 fulcrumed as at 62 and adapted to actuate a short sleeve 63 having a forked lateral extension 64 straddling the movable clutch member and registering with a groove therein, the sleeve 63 is slidably mounted on a rod 65 and a helical spring 66 encircling the latter is adapted to yieldingly maintain the clutch member 54 out of engagement with the member 53. The free end of the controlling lever 60 is located at the front of the tub immediately beneath the same and it may be locked in position with the clutch members 53 and 55 in relative interengagement by a shoulder 70 presented by a guide 71 through which the lever projects.

The wringer proper, which is indicated at 80, is constructed and arranged to swing laterally above the top of the tub upon an upward extension of a bearing bracket 82 secured to the adjacent wall of the tub. This is accomplished by means of a bracket secured to one end of the wringer near the bottom thereof and having a collar 83 encircling the extension 82, the collar being split as at 84 and adapted to be clamped in any desired position by a screw 85 having a handle 87. This construction and arrangement of parts enables the wringer to be so positioned that the clothes being wrung out may be transferred from the machine to independent tubs.

The mechanism for effecting an operative connection between the rolls of the wringer which are indicated at 86 and 88 and the worm-wheel 50 consists of a bevel gear 89 mounted upon the end of the roll 88 adjacent the collar 83 and intermeshing with a second bevel gear 90 mounted rigidly upon the upper end of a vertical shaft 91 which passes downwardly through a vertical boring 92 in the bracket 82 to a point within close proximity to the shaft 48 the shaft being housed by a sleeve 93 having its opposite end connected to the bracket 82 and a second bearing bracket 94 of angular form mounted upon the platform 34 with its upper end overhanging a movable duplex clutch member of a clutch for operatively connecting the worm-wheel 50 to the shaft 91. This duplex member which is mounted upon shaft 48 and rotatably and axially movable relatively thereto, consists of a pair of spaced miter gears 96 and 97 connected together by an intermediate sleeve 98, the gears being located on opposite sides of the fixed clutch member which is a gear 95 mounted upon the lower end of shaft 91. The gears 96 and 97 are spaced a sufficient distance apart to enable them to be so positioned that neither will be in intermeshing relation with the gear 95. The duplex clutch member is operatively connected to the worm-wheel 50 by a pair of interengaging collars 99 and 100 the former being rotatable in unison with the worm-wheel. These collars are constantly in interengagement irrespective of the duplex clutch member, their function being to permit of axial movement of the latter while effecting an operative connection between the same and the worm-wheel 50. In order to provide a manually operated means for shifting the duplex member to start the wringer or to reverse the direction of rota-

tion of the rolls thereof an operating lever is connected to the duplex member. This operating lever which is indicated at 175 parallel to the shaft 91 has its upper end fulcrumed in a bracket 101 secured to the side of the tub. This bracket has a flange 102 with preferably three notches 103, 104 and 105 therein, the intermediate notch 104 being deeper than the other two and adapted to receive a detent 106 formed integrally with a handle 109 and the lever when the duplex clutch member is in neutral position and the wringer idle the detent registering with either of the notches 103 or 105 when the duplex member is in intermeshing relation with the gear 95. A helical spring 110 which encircles the upper end of the lever and bears between a collar 112 thereon and the bracket 101 yieldingly retains the detent in the notch in which it has been positioned the lower end of the lever 175 is mounted in a bracket 113 and operatively connected to a short rod 114 through an offset pin 115 engaging an eye 116 in the outer end of said rod. This rod projects slidably through bracket 94 and is connected to a forked arm 117 straddling the collar 100 which is connected to the duplex clutch member. By turning the operating lever on its axis a pull or push is exerted upon the rod through the offset pin 115 which causes axial travel of the duplex member. With this construction and arrangement of parts when the load of the wringer becomes too great for the motor the outward thrust of the miter gears will automatically shift the duplex member out of engagement with gear 95 thereby preventing the motor being burned out.

All the interengaging parts which are liable to catch the clothes of the operator are inclosed in housings 200.

Operation.

The operation of our improved washing machine is as follows:

The tub is filled with water to the desired level and the clothes placed between the agitator and the surrounding walls of the tub with the clothes in position and the cover clamped on tight the machine is ready to be set in motion.

The motor is now started by closing the circuit (not shown) and the controlling lever 60 moved to the left into engagement with the shoulder 70, this movement of the lever shifting the movable clutch 54 into interengagement with the member 53 thereby effecting an operative connection between the motor and bevel gear 41 through shaft 48, crank-arm 47, link 46 and segmental gear 42. As shaft 48 rotates moving with it the crank-arm 47, the segmental gear is caused to oscillate the springs 37 offering a yielding resistance to such a movement. This oscillatory movement is transmitted through the bevel gear 41 to its shaft 30 which actuates the agitator 13 through the lower transmission sleeve 20. As the agitator oscillates the extent of the oscillation being approximately one half revolution, the clothes rub against the corrugated side of the tub and the agitator is free to follow the path of least resistance and to move up and down its sleeve 20 thereby overcoming the wear and tear which is frequently experienced in machines of this type. When the clothes have been thoroughly washed the water may be drained off through a waste outlet (not shown) and the clothes removed. If desired the agitator may also be lifted out and the interior cleaned out.

The clothes may now be passed through the wringer, the latter being set in motion by moving the handle 109 of the lever 175 to the left or right thereby seating the detent 106 in one of the notches 103 or 105 and shifting the duplex member into engagement with the gear 105. The direction of rotation of the wringer rolls is reversed by moving the handle 107 in the opposite direction to its initial movement.

What we claim is as follows:

1. In a washing machine, an agitator presenting a plurality of radially disposed blades, each blade being slotted and having its underside inclined upwardly and outwardly.

2. In a washing machine, an agitator presenting a plurality of radially disposed blades, each blade being tapered toward its outer end and having a vertical slot therein and having its underside inclined upwardly and outwardly and members of substantially triangular cross section located between the blade, each presenting a face at an obtuse angle to the adjacent faces of the blades.

In testimony whereof we have signed our names to this specification in the presence of two witnesses.

FRANK RITZ.
JOHN H. BROOK.

Witnesses:
H. M. CRISHMAN,
F. M. DAVIS.

1932

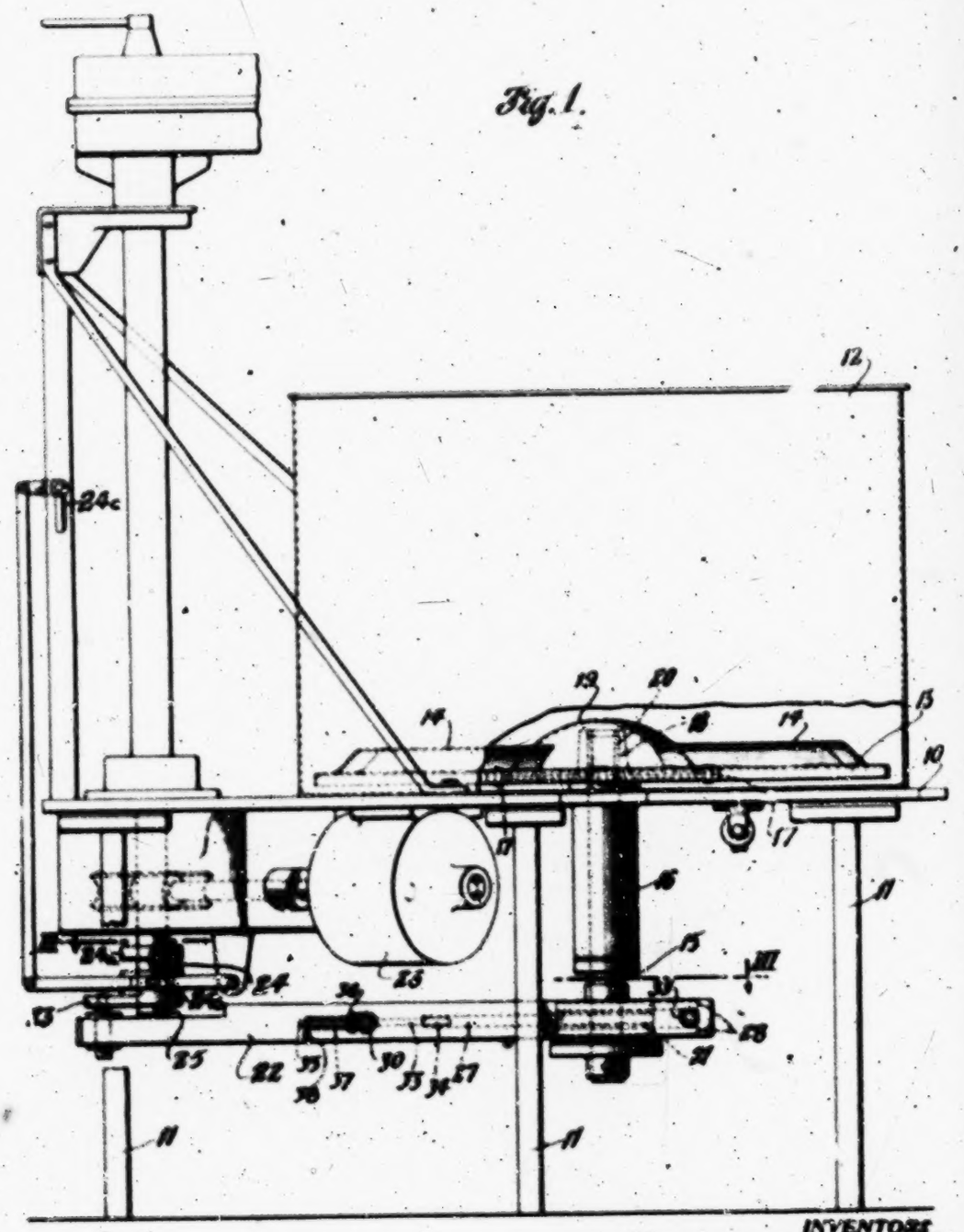
June 3, 1924. 1,496,305

H. W. DOUGHTY ET AL

WASHING MACHINE

Filed April 8, 1922 2 Sheets-Sheet 1

Fig. 1.



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H. W. DOUGHTY ET AL

WASHING MACHINE

Filed April 8, 1922 2 Sheets-Sheet 2

Fig. 3.

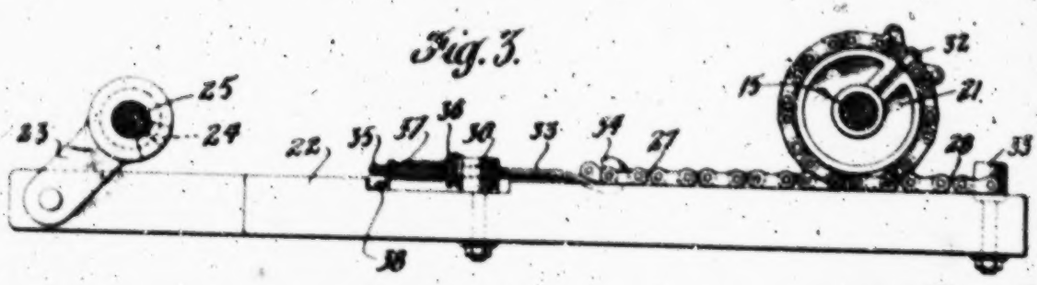


Fig. 4.

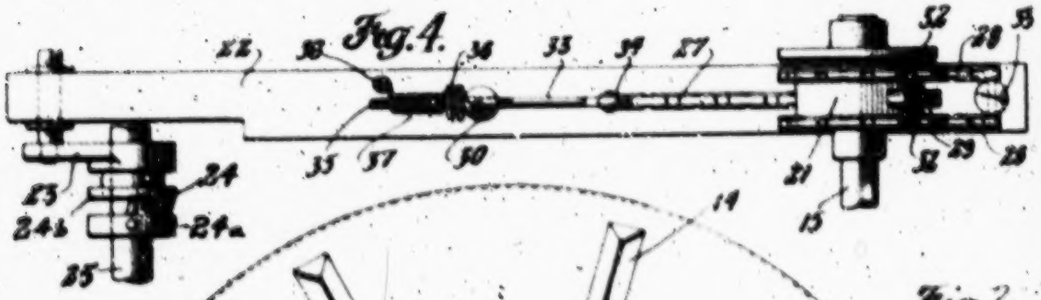


Fig. 2.

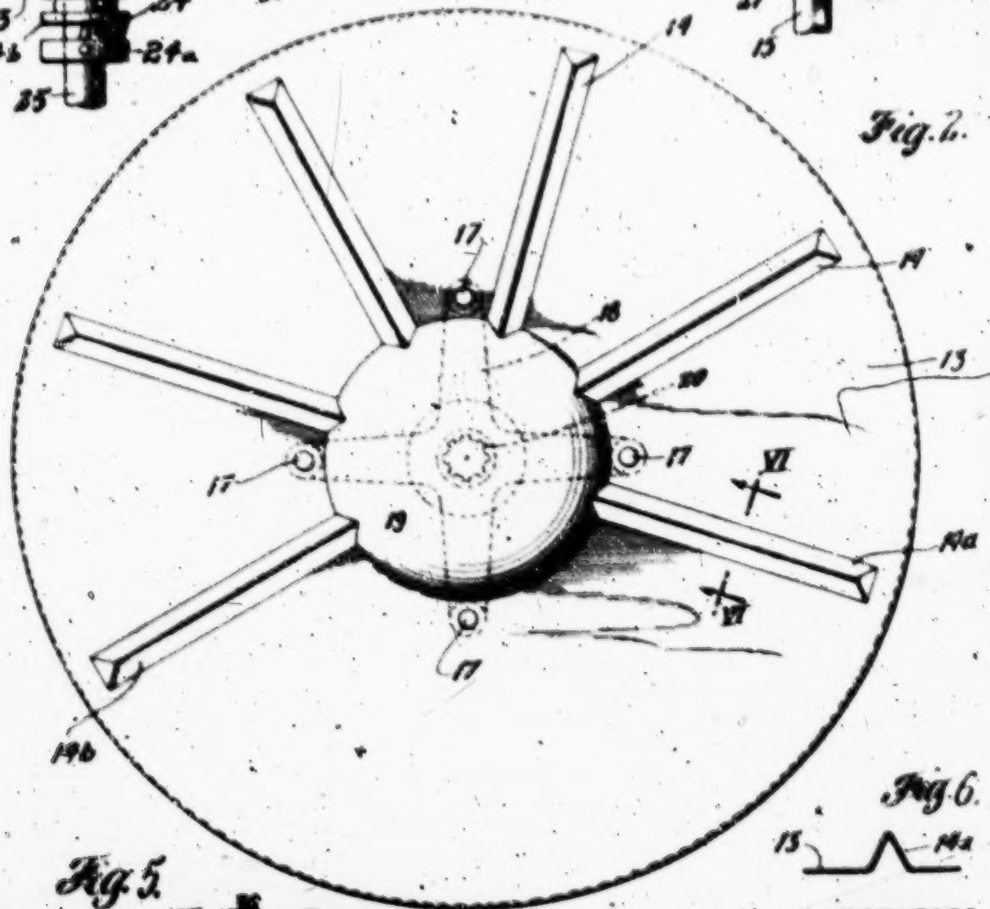
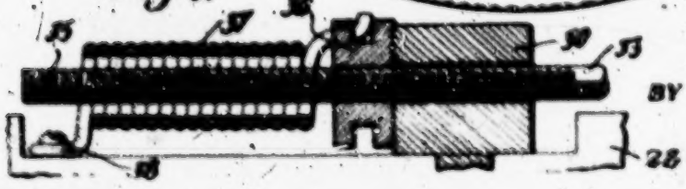


Fig. 6.

Fig. 5.



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Patented June 3, 1924.

1,496,305

UNITED STATES PATENT OFFICE.

HERMAN W. DOUGHTY AND GEORGE L. DAVIS, OF BINGHAMTON, NEW YORK, ASSIGNORS TO THE MINSTREL KUNDERD WASHER COMPANY, OF BINGHAMTON, NEW YORK, A CORPORATION OF NEW YORK.

WASHING MACHINE.

Application filed April 8, 1922. Serial No. 550,607.

To all whom it may concern:

Be it known that we, HERMAN W. DOUGHTY and GEORGE L. DAVIS, citizens of the United States, and residents of Binghamton, county of Broome, and State of New York, have jointly invented certain new and useful Improvements in Washing Machines, of which the following is a description.

This invention relates to washing machines for washing clothes, and particularly to machines of this character which are operated by power as distinguished from hand-operated machines. Certain features of our invention, however, are applicable alike to machines of both of these types, as will appear hereinafter.

The primary object of our invention is to provide a machine of the character described, which shall be at once accessible, convenient and efficient.

The particular type of machine illustrated and described herein is what is sometimes called the "agitator" type. That is to say, it includes a stationary tub for receiving the clothes to be washed and the cleansing fluid, such as soapy water, and a movable "agitator" within the tub and adapted by its movement to agitate the cleansing fluid and the clothes and thus cause the cleansing fluid to penetrate the clothes and clean them. Heretofore the agitator in machines of this type has generally been so arranged as to overlie the clothes during the washing operation. This has made it necessary to remove the agitator before clothes could be placed in the tub or removed therefrom. In order to eliminate this inconvenience we have placed the agitator adjacent the bottom of the tub, so that it underlies the clothes, and we have discovered that an agitator so placed is more efficient if of an unsymmetrical design.

Accordingly it is one object of our invention to provide an agitator which is adapted to underlie the clothes, and which is so designed as to render it highly efficient.

Another object of our invention is to provide novel and efficient actuating means for the agitator.

Still another object of our invention is to provide improved means for mounting the agitator on its actuating shaft.

With these and other objects in view, as will appear hereinafter, our invention consists in the parts, combinations and devices described herein, and more particularly defined in the appended claims.

Referring to the drawings:

Fig. 1 is an elevation of our improved machine, partly in section;

Fig. 2 is a plan of the agitator;

Fig. 3 is a horizontal sectional view taken on the line III—III of Fig. 1;

Fig. 4 is an elevation of the parts shown in Fig. 3;

Fig. 5 is an enlarged sectional view of the chain tightening device shown in Figs. 3 and 4; and

Fig. 6 is a sectional view on line VI—VI of Fig. 2.

In the drawing 10 designates the frame for supporting our improved machine, which frame may be of any suitable design, as for example, that shown in the drawing (Fig. 1) wherein it is provided with three supporting legs 11. Upon this frame is mounted the tub 12, which may be of any desired shape and construction. As herein shown the tub is cylindrical in design. It is open at the top where it is preferably provided with a removable or hinged cover (not shown).

Located within the tub in such a position that it is adapted to underlie the clothes is the agitator 13, which is provided on its upper surface with agitating means such, for example, as the radially arranged vanes or ribs 14. In the particular construction shown these vanes or ribs are struck up from the sheet metal of which the agitator is made. They may, however, be of any other suitable construction, such for example as wooden ribs secured in any desired manner to a wooden or metal agitator.

The agitator 13 is of the rotary type, means (which we will describe later) being provided for oscillating it through the vertical shaft 15. This shaft 15 projects through the bottom of the tub 12. Leakage is prevented by the provision of a stuffing box such as indicated at 16. We preferably mount the agitator on the shaft 15 in the following manner. We secure the agitator 13 in any suitable manner, as indicated at 17, to a spider 18 of any suitable rigid material, the agitator being preferably domed at the center, as indicated at 19, so as to overlie the spider. This spider 18 in turn

is adapted for splined engagement with the shaft 15 as indicated at 20. By this construction we have provided means whereby the agitator is normally connected to oscillate with the shaft 15, but is adapted to be readily removed therefrom, for the purpose of cleaning the tub and the like, by merely lifting it off.

Referring now particularly to Fig. 2, it will be noted that the vanes or ribs 14 are unsymmetrically arranged. The purpose of so arranging the vanes is that we have found that if the agitator surface is symmetrical there is a marked tendency for a single one of the many pieces of laundry in the tub to cling to the agitator, an action which interferes seriously with the efficiency of the machine in washing. This action is apparently due to the fact that the oscillation of the agitator sets up currents in the fluid contents of the tub which move centrifugally of the agitator. And if the agitator is symmetrical these currents act with substantially equal force throughout the periphery of the agitator and tend to stretch the most available piece of laundry over the surface of the agitator and keep it there.

We have discovered, however, that by arranging the agitator unsymmetrically the equality of the currents is disturbed and as a result the piece of cloth in contact with the agitator will not be retained there but will be moved off to one side by the unequal currents acting upon it.

Many different unsymmetrical designs of agitators will accomplish this result and therefore come within the scope of our invention. The particular unsymmetrical design illustrated in Fig. 2 is formed by spacing one consecutive pair of vanes, such for example as the vanes 14ª, 14ª, farther apart than other similar pairs. We have found that by using an agitator of this type no single piece of cloth remains in contact with the agitator for an undue length of time.

Coming now to the means for actuating the agitator, we provide the shaft 15 at a point below the bottom of the tank 12 with a drum 21 (Figs. 1, 3 and 4). Mounted adjacent this drum is the connecting rod 22 which is adapted to be reciprocated by the crank 22. This crank 23 is controlled by the clutch 24 and when the clutch is engaged the crank 23 is rotated by the vertical shaft 25, which in turn is operated by the motor 26, or any other suitable source of power.

The clutch 24 which we have provided is novel, so far as we are aware. It comprises the collar 24ª which is pinned or secured in any other desired manner to the vertical shaft 25, and the collar 24ᵇ which is integral with the crank 23 loosely mounted on said shaft. The collars 24ª, 24ᵇ, have coacting clutch teeth which, when the crank is elevated as shown in Fig. 1, engage to drive the crank. When, however, the crank is depressed the teeth are disengaged and the crank remains idle. Any suitable and convenient means, such as the hand lever 24ᶜ with its connections may be employed for elevating and depressing the crank 23 to engage and disengage the clutch.

The advantage of the clutch which we have described above resides primarily in its ease and economy of manufacture. It requires no keys, keyways or splines. All that is necessary, so far as the shaft 25 is concerned, is the securing of the collar 24ª thereto, as by means of the pin illustrated.

The means for operatively connecting the connecting rod 22 to the drum 21, as herein shown, comprise two flexible members 27, 28. The member 27 may be in the form of a single chain 27, one end of which is secured to the drum at 29 and the other end of which is secured to the connecting rod 22 at a point 30 which is toward the crank end of the latter. The other flexible member 28 may be in the form of a double chain, one end of which is secured to the drum at the point 32 and the other end of which is secured to the connecting rod 22 at the point 33 which is at or toward the free end of the connecting rod. As will appear from the drawing, the flexible members 27 and 28 are so arranged that they are adapted to wind up on the drum 21 in opposite directions.

By virtue of the construction just described the drum 21 and through it the agitator 13 are oscillated in a regular and quiet manner.

In the course of continued oscillation of a part such as the agitator 13, considerable strain is placed upon the driving means due largely to the rather sudden reversals in the direction of movement of the parts. As a result, if no provision were made to guard against it, the flexible members might become loose. The result would be an inefficient and noisy drive. Accordingly, we have provided means for automatically taking up any slack that may occur in the flexible members.

This automatic take-up means, as herein shown, comprises a bolt 33, one end 34 of which is adapted to engage the flexible member 27 and the other end 35 of which passes through the eye 30 secured to the connecting rod 22. The end 35 is screw threaded and provided with a nut 36 which, in cooperation with the eye 30, secures the flexible member 27 to the connecting rod. For keeping this nut 36 tight we provide a spring such as 37, (Figs. 3, 4 and 5), one end of which is secured to the connecting rod 22 at 38 and the other end of which engages

notch in the nut 36. During the reciprocation of the connecting rod 22 there are intervals of time, such as those occurring upon the reversal of movement, during which the flexible members are not subjected to tension by the normal operation of the machine. At such times, if there is any slack in the flexible members, the spring 37 will rotate the nut 36 and take it up. Thus the arrangement described serves to maintain the flexible members 27, 28, taut at all times.

The washing machine herein shown has been found in practice to be very efficient as a clothes washing mechanism and very convenient to operate and keep clean. The agitator being at the bottom and there being no obstruction in the tub above the agitator, it is a very simple matter to place clothes in the tub and to remove them therefrom. We are aware that agitators or dollys have heretofore been placed adjacent the bottom of the stationary tub of a washing machine. But so far as we are aware we are the first so to arrange the operating mechanism of an agitator which is located adjacent the bottom of the tub that there is no obstruction above the agitator. Also, the agitator as a whole may be readily removed from the tub when desired, for the purpose of cleaning.

The actuating mechanism which we have provided for oscillating the agitator are particularly efficient and noiseless in operation, due in part to the automatic take-up means which we have provided.

The terms and expressions which we have employed are used as terms of description and not of limitation, and we have no intention, in the use of such terms and expressions, of excluding any mechanical equivalent of the features shown and described, or portions thereof, but recognise that various modifications are possible within the scope of the invention claimed.

What we claim is:

1. In a washing machine, a container, an agitator located therein, and means for actuating said agitator, said agitator including a plurality of vanes of which those located at one portion of the agitator are spaced differently than the remainder.

2. In a washing machine, a container, an agitator located therein, and means for actuating said agitator, said agitator including a plurality of vanes between one consecutive pair of which there is a greater distance than there is between certain other consecutive pairs.

3. In a washing machine, a container, an agitator located adjacent the bottom thereof, and means for oscillating said agitator, said agitator being provided on its upper surface with a plurality of radially disposed vanes between one consecutive pair of which there is a greater distance than there is between certain other consecutive pairs.

HERMAN W. DOUGHTY.
GEORGE L. DAVIS.

N° 18,202 A.D. 1891

Date of Application, 23rd Oct., 1891
Complete Specification Left, 21st July, 1892—Accepted, 1st Oct., 1892

PROVISIONAL SPECIFICATION.

Improvements in Washing Machines.

I ELIZA JANE JARDINE of Dromore in the County of Down in Ireland Spinster do hereby declare the nature of this invention to be as follows:—

My invention relates to machines employed in the cleansing of linen cambric and other similar materials which are liable to damage by being caught between the rim or bottom of the machine and the dolly.

In order to prevent such damage I employ a horizontal ring set and bolted into a groove in the bottom of the machine and furnished with perpendicular pins and springs which support a flanged or tongued hoop or rim equal in circumference to the periphery of the dolly.

I provide the flange or tongue of the hoop or rim with sockets into which the pins pass so as to prevent the movement of the hoop or rim in a lateral direction.

The springs keep the flanged or tongued hoop or rim in contact with the rim of the dolly so that there is not any interval between them for the materials being cleansed to be caught in and damaged by.

I may, however, keep the flanged or tongued hoop or rim in position by other means than perpendicular pins.

Dated this 22nd day of October 1891.

HYNDMAN & DICKSON,
6, Chichester Street, Belfast, Agents for Applicant.

COMPLETE SPECIFICATION.

Improvements in Washing Machines.

I ELIZA JANE JARDINE of Dromore in the County of Down in Ireland Spinster do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

My invention relates to machines employed in the cleansing of linen, cambric and other similar materials which are liable to damage by being caught between the rim or bottom of the machine and the dolly and is specially applicable to machines consisting of a circular tub or vessel with vertical ribs or projections on its inner surface and of a dolly composed of a disc with an elongated boss or centre carrying projecting ribs and caused to rotate in each direction alternately and reciprocally.

In order to prevent such damage as I have mentioned I employ a horizontal stationary ring set into a groove in the bottom of the machine and furnished at intervals with perpendicular pins and springs which stay or control and support a flanged or tongued hoop or rim equal in circumference to the periphery of the dolly.

I provide the flange or tongue of this hoop or rim with sockets into which the perpendicular pins pass so as to prevent the movement of the hoop or rim with the dolly in a lateral direction.

The springs keep the flanged or tongued rim in contact with the rim of the dolly so that there is not any interval between them for the materials being cleansed to be caught in and damaged by, while the elasticity of the supports of the stationary hoop or rim allows it also to adjust itself to variations in the vertical position of the dolly.

[Over 3d.]

In constructing my improved machine for practical use I have made some modifications in my arrangements which I prefer. According to these modifications, instead of placing the dolly above the horizontal ring and flanged or tongued loop or rim, I combine it within them and furnish it, on its upper surface, with a horizontal projecting circular flange against the under surface of which the flanges or tongues of the loop or rim is pressed into close contact by means of the supporting springs so as to form a close fitting joint between them.

This loop or rim is provided on the under surface with cavities or recesses to receive the perpendicular pins and springs which are fixed in a grooved or flanged horizontal stationary ring attached to the bottom of the tub or vessel and enclosing the flanged or tongued loop or rim. I may employ additional springs at intervals independently of the perpendicular pins and the loop or rim may be slotted, grooved or perforated between the pins and springs for the purpose of making it lighter.

And in order that my said invention may be more fully understood I shall now proceed to refer to the figures and letters upon the several sheets of drawings hereunto annexed the same letters of reference indicating the same or corresponding parts of my improved washing machine throughout all the figures.

Fig. 1 is a plan of a circular washing machine with vertical ribs and a dolly having an elongated base or centre with projecting ribs and a shown the disc provided with a horizontal projecting circular flange, the rim of the disc or base being indicated by a dotted line on the flange. The positions of the perpendicular pins and springs are indicated by small circles also on the flange.

Fig. 2 is a cross section of the same machine and dolly which shows the horizontal projecting circular flange on the upper surface of the disc or base of the dolly, the loop or rim with its flanges or tongues in contact with the under surface of the horizontal projecting circular flange and furnished with recesses to receive and engage or centralize and supported by perpendicular pins and springs fixed in a grooved or flanged ring attached to the bottom of the tub or vessel and enclosing the flanged or tongued loop or rim and

Fig. 3 is an enlargement in section of the periphery of the dolly's disc or base, the horizontal projecting circular flange, a spring or recess in the loop or rim and the grooved or flanged ring attached to the bottom of the tub or vessel and furnished with a pin and spring to stay or control and support the loop or rim.

a is the tub or vessel with vertical ribs or projections *a', a', a'*, and *a²* is the grooved or flanged ring attached to the bottom of the tub or vessel, *a³ b* is the disc or base of the dolly and *b'* the elongated base or centre on its upper surface, with the projecting ribs *b', b'*; *b²* is the horizontal projecting circular flange on the disc or base of the dolly *b*; *c* is the loop or rim with its flanges or tongues, *c', c'*, kept in close contact with the under side of the horizontal projecting circular flange, *b²*, by means of the springs, *d*, and prevented from moving in a lateral direction by means of the perpendicular pins, *d', d'*, and *d²* is one of the recesses into which the springs, *d*, and the perpendicular pins, *d'*, pass for the purposes above mentioned.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed I declare that what I claim is

1. The use, in circular washing machines with a revolving or reciprocating dolly, of a non-revolving loop or rim arranged with flanges and recesses, shaped and controlled by perpendicular pins and supported on springs substantially in the manner and for the purposes hereinbefore described and shown in the drawings hereunto annexed.

2. The use, in circular washing machines with a revolving or reciprocating dolly, of a grooved ring or a groove arranged with perpendicular pins and springs substantially in the manner and for the purposes hereinbefore described and shown in the drawings hereunto annexed and

Jordan's Improvements in Washing Machines.

3. The combination and arrangement of parts constituting my improved washing machine constructed and employed substantially in the manner and for the purposes hereinbefore described and illustrated by the drawings on the sheet hereunto annexed.

Dated this 30th day of July 1892.

HYNDMAN & DICKSON,
6, Chichester Street, Belfast, Agents for Applicant.

London: Printed for Her Majesty's Stationery Office, by Darling & Son, Ltd.—1892

940 87

A.D. 1891. Oct. 23. N° 16,291

JARDINES Complete Specification.

SHEET 1

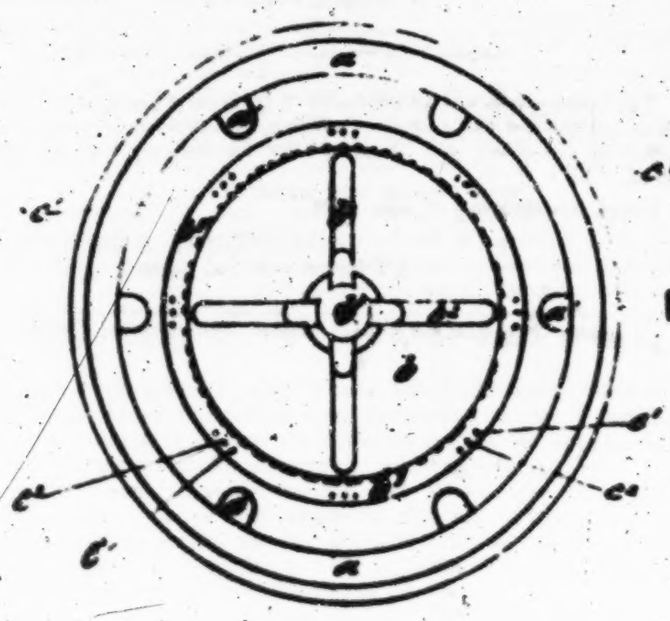

Fig.1

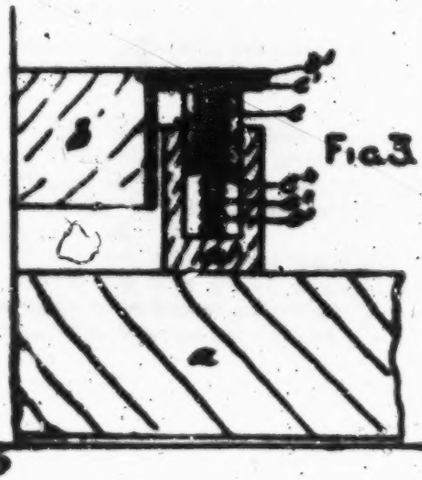

Fig.3

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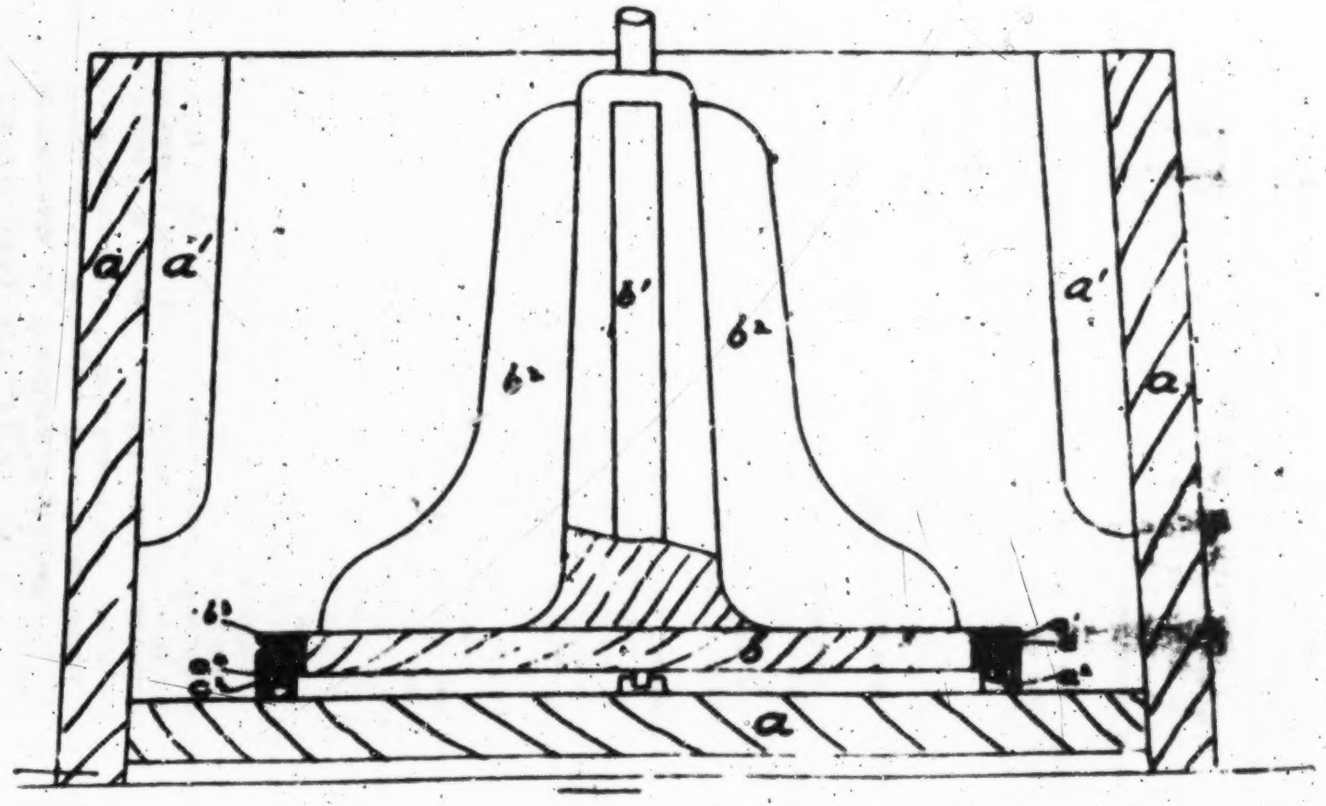
FIG. 2.



942

N° 19,027 A.D. 1889

Date of Application, 27th Nov., 1889
Complete Specification Left, 26th Aug., 1890—Accepted, 27th Sept., 1890

PROVISIONAL SPECIFICATION.

Improvements in Washing Machines.

WILLIAM GEORGE HANNA of 24 Wellington Place Belfast Ireland, Agent do hereby declare the nature of this invention to be as follows:—

The object of this invention is to remedy a defect in washing machines as hitherto made which have vertical rotating blades inside a stationary casing with ribs inside it. The defect being the liability to injure the goods being washed by tearing or nipping them between the revolving disc which forms the base for the revolving blades and the stationary surrounding flange or segment on the inside of the casing.

To prevent the goods that are being washed from being caught in the space between the revolving disc and the stationary internal flange or segment I make the adjacent surfaces of the revolving disc and stationary flange or segment bevelled instead of vertical or horizontal as hitherto made and instead of the rotating blades being entirely within the diameter of the disc, I make a part of the rotatory blades project beyond the rim of the disc but not touching the segment or stationary internal flange, so that when the blades revolve the goods are thrown outwards past the joint between the revolving disc and the internal stationary flange or bevelled segment.

The revolving disc is supported at its outer edge by a ring carried on arms attached to a boss fitted to the vertical spindle.

And to lessen prevent or divert the current of water from passing between the bevelled faces in addition to the holes usually in the revolving disc, I also make holes in the stationary internal flange or segment so as to connect the spaces above and below the disc and stationary flange or segment which surrounds it.

Both the disc and the internal flange or segment I prefer to be made of metal as being less liable to warp or twist out of shape.

Provision is also made for raising or lowering the spindle which carries the disc ring and blades so that the bevelled faces may be made to work as close as desired.

These various devices and improvements effectually prevent the goods in process of washing from being caught or nipped in the space between the disc and flange or segment and remedy an admitted defect in this make of washing machine.

Dated this 25th day of November 1889.

WILLIAM GEORGE HANNA.

COMPLETE SPECIFICATION.

Improvements in Washing Machines.

WILLIAM GEORGE HANNA of 24 Wellington Place Belfast Ireland Agent do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

The object of this invention is to remedy a defect in washing machines as hitherto made which have vertical rotating blades inside a stationary casing with ribs inside it. The defect being the liability to injure the goods being washed by tearing or nipping them between the revolving disc which forms the base for the revolving blades and the stationary surrounding flange or segment on the inside of the casing.

The means employed to remedy this defect are illustrated in the drawing herewith in which Fig. 1 is a vertical section of the machine and Fig. 2 a horizontal section of the machine which is designed to be driven by a belt. The same letters and figures of reference are employed to indicate the same or like parts.

To prevent the goods that are being washed from being caught in the space between the revolving disc (a) and the stationary internal flange (b) I make the

adjacent surface of the revolving disc (*a*) and stationary segment or flange (*b*) bevelled instead of vertical or horizontal as hitherto made and instead of the rotating blades (a^1) being entirely within the diameter of the disc (*a*) I make a part of the rotating blades (a^1) project beyond the rim of the disc (*a*) but not touching the segment or stationary internal flange (*b*) so that when the blades (a^1) revolve the goods are thrown outwards past the joint or space between the revolving disc (*a*) and the internal stationary flange or bevelled segment (*b*). The projection of the rotating blades (a^1) throws the goods over the perforations in the segment (*b*) and so they are between the contrary currents presented by the rotating blades (a^1) and the stationary projections (*d*) on the inside of the flange.

The revolving disc (*a*) which is preferably made of copper or other material not liable to corrode is supported at its outer edge by a ring (a^2) carried on arms (a^3) attached to a boss fitted to the vertical spindle (*e*).

To lessen prevent or divert the current of water from passing between the bevelled faces in addition to the holes usually in the revolving disc (*a*) I also make holes (b^1) in the stationary internal flange or segment (*b*) so as to connect the spaces above and below the disc (*a*) and stationary flange or segment (*b*) which surrounds it.

Both the disc (*a*) and the internal flange or segment (*b*) I prefer to be made of metal as being less liable than wood to warp or twist out of proper shape.

Provision is also made by means of a screw on the foot step (e^1) for raising or lowering the spindle (*e*) which carries the disc (*a*) ring (a^2) and blades (a^1) so that the bevelled faces may be made to work as close as possible. These various devices and improvements effectually prevent the goods in process of washing from being caught or nipped in the space between the disc (*a*) and flange (*b*) and remedy an admitted defect in this make of washing machine.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

In washing machines with blades revolving on a vertical axis making the blades project past the joint between the disc and segment and making the adjacent faces bevelled and also making holes in the segment all as herein described and illustrated.

Dated this 23rd day of August 1890.

0 89

WILLIAM GEORGE HANNA.

London: Printed for Her Majesty's Stationery Office, by Darling & Son, Ltd.—1890.

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1 SHEET

FIG:2.

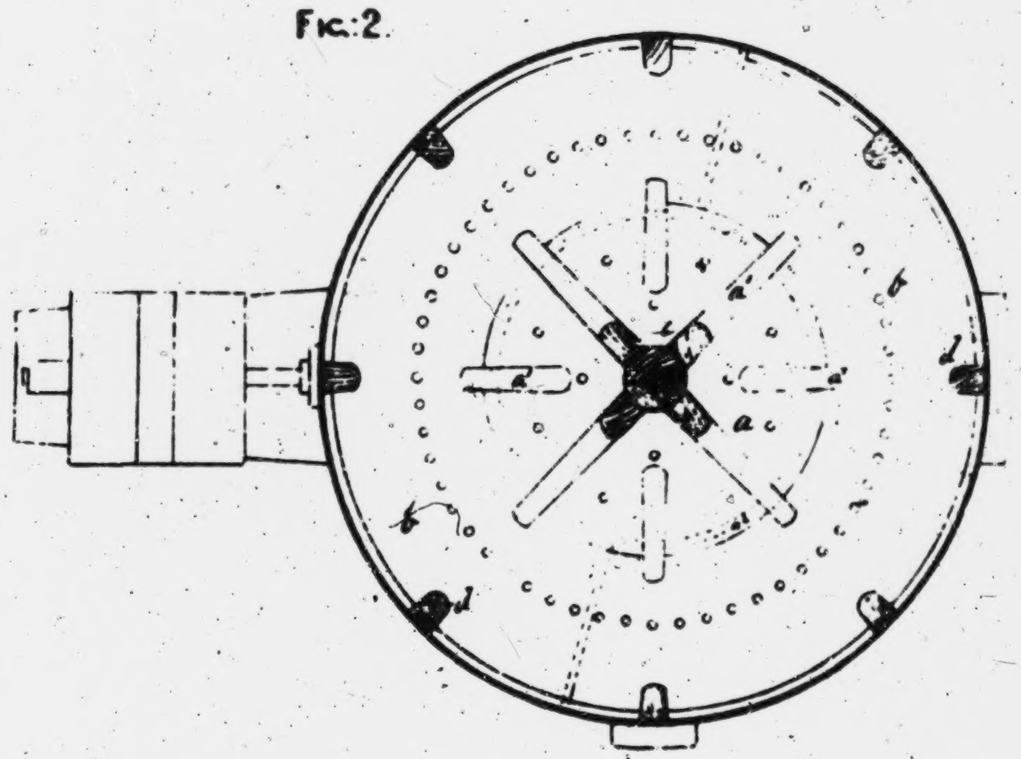
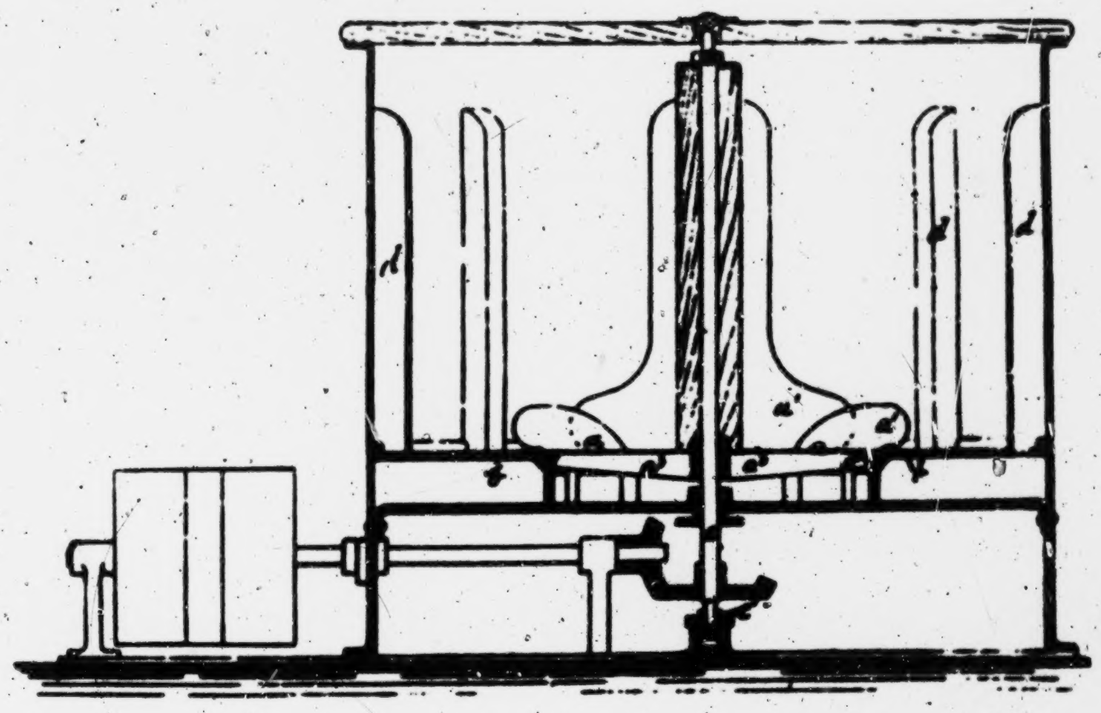


FIG:1.



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N° 19,566 A.D. 1892

Date of Application, 31st Oct., 1892
Complete Specification Left, 2nd Mar., 1893—Accepted, 8th Apr., 1893

PROVISIONAL SPECIFICATION.

An Improved Washing Machine.

I, EDWARD JOHN BARNES, of 13, Nicholas Street, Mile End, Middlesex, Account Book Manufacturer, do hereby declare the nature of the said invention to be as follows:—

Ordinary washing machines are unnecessarily complicated and are much too costly for those possessed of scanty means yet needing such machines.

The special object of the present invention is to produce an efficient washing machine of simple and inexpensive construction, suitable for the requirements and within the means of most if not all those having occasion to use such machines, and which, moreover, when not in use for its primary purpose of utility, may be used as a sideboard, table or the like.

In its preferred and simplest form, the improved machine is made table-height, and of a square formation in plan by suitably joining the boards of which the sides are formed in a water-tight manner, and by suitably fitting a board-bottom between the sides in a like manner and at any desired distance from the open top of the tub or vessel thus formed. The bottom is preferably arranged at a slight inclination, at the lowest part of which an outlet either at the bottom or side of the tub is made and controlled by a plug or tap.

Centrally within the tub there is arranged a vertical dasher of the construction hereinafter described, the spindle of which fits into a cup or step let into the bottom of the tub and is guided at its top end by a cross-bar.

The dasher consists of a series (preferably four) of vanes of any suitable height and width, each of which is nailed, screwed or otherwise equivalently secured in a simple yet secure manner to a squared side of the said spindle so as to be disposed tangentially thereto.

The spindle and dasher are preferably arranged to be removable from the tub (to facilitate the removal of the washed articles) and for such purpose the bearing part of said cross-bar is made with a dove-tailed removable sector, on the removal of which the spindle and dasher may be removed from the tub.

The spindle may project above the bearing and be squared externally suitable for the application of a removable cranked handle adapted to fit on and turn the spindle. Or, in lieu of projecting, as aforesaid, the upper part of the spindle may be made with a squared socket adapted to receive a squared spigot end of a removable cranked handle adapted as aforesaid.

The top of the tub is fitted with half lids which are or may be hinged to its opposite sides, so that when the machine is desired to be used for washing, the lids may be turned over so as to cover the tub and prevent any splashing over of the washing liquid agitated by the working of the dasher; and so that when it is desired to remove the washed articles from the tub, the lids may be turned down to the outer sides of the tub out of the way; and so that when the machine is not in use for washing, the lids may be turned up and over so as to cover the open top of the tub and render the machine suitable for use as a sideboard, table or the like upon the removal of the handle.

The most efficient action is obtained with such machine by reciprocating the dasher, in each actuation rotating the same about three-quarters of a revolution.

The said machine may be modified by making the tub of a cylindrical or other shape in plan, by corrugating its inner surface, by making the vanes of the dasher of a convex, concave or angular formation, and by perforating the same; but I believe the construction hereinbefore firstly described to be the best having regard to the specified object of the invention.

[*Price 8d.*]

There may be detachably or otherwise applied to the machine a simple wringing or mangling attachment in which the upper roller is held to the lower one by the tension of suitably arranged spiral springs, or any other suitable wringing or mangling attachment may be detachably or otherwise fitted to one side of the tub.

Dated this 29th day of October 1892.

DAY, DAVIES & HUNT,
321, High Holborn, London, W.C., Agents for the Applicant.

COMPLETE SPECIFICATION.

An Improved Washing Machine.

I, EDWARD JOHN BARNES, of 12, Nicholas Street, Mile End, Middlesex, Account Book Manufacturer do hereby declare the nature of the said invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement :—

Ordinary washing machines are unnecessarily complicated and much too costly for those possessed of scanty means yet needing such machines.

The special object of the present invention is to produce an efficient washing machine of simple and inexpensive construction, suitable for the requirements and within the means of most if not all those having occasion to use such machines and which, moreover, when not in use for its primary purpose of utility, may be used as a sideboard, table or the like.

The improved machine is represented on the accompanying drawings, in which :—

Figs. 1 and 2 represent sectional elevations of the same in planes at right angles to each other.

Fig. 3, represents a plan view of the dasher, and,—

Fig. 4, represents details of the means of removably securing the dasher in working position.

The improved machine is made table-height and of a square formation in plan. Its sides 5, are formed of boards which are tongued or otherwise suitably joined together in a water-tight manner, and its bottom 6, is similarly formed and is fitted between the sides 5, and is supported by bearers 7, at any desired distance from the open top of the tub or vessel thus formed. The bottom is preferably arranged at a slight inclination at the lowest part of which a hooked outlet 8, through either the bottom or side of the vessel is made and controlled by a plug 9, or a tap. Within the vessel is fitted a correspondingly shaped zinc lining 10, which is secured around the mouth of the vessel by lines 11.

Centrally within the vessel is arranged a vertical dasher formed of a series (preferably four) of vanes 12, of any suitable height and width, each of which is welded, screwed or otherwise equivalently secured as at 13, (*vide* Figs. 1 to 3,) in a simple yet secure manner to a side of a squared centre post 14, so as to be disposed symmetrically therein.

One opposite pair of the vanes 12, is preferably arranged somewhat higher than the other pair thereof, *vide* Figs. 1 and 2. The outer corners thereof are rounded off as at 15, and the lower corners are chamfered off as at 16, to avoid liability of damaging the fabrics. The bottom end of the post 14, is fitted with a metal cup 17, which rests on a step 18, secured to the bottom of the washing vessel, and into the top end of the post is fitted the squared end of a spindle 19, fitted with a collar 20. The upper projecting part of the spindle 19, is cylindrical and works in a bearing 21, bolted to a cross bar 22 which stretches across from side to side of the vessel, the bearing being fitted with a downfitted removable centre 23, on the removal of which the spindle and dasher may be removed from the vessel to facilitate the removal of the washed articles.

The spindle 19, may, as represented, project above the bearing 21, and be squared

as at 24, and fitted with a removable cranked handle 25, adapted to turn the spindle. Or, in lieu of projecting as aforesaid, the upper part of the spindle 19, may be made with a squared socket adapted to receive a squared spigot end of a removable cranked handle adapted as aforesaid.

The top of the tub or vessel is fitted with half lids 26, which are or may be hinged as at 27, to its opposite sides, so that when the machine is desired to be used for washing, the lids may be turned over so as to cover the tub, (*vide* the full lines Fig. 2,) and prevent any splashing over of the washing liquid agitated by the working of the dasher, and so that when it is desired to remove the washed articles from the tub, the lids may be turned down to the outer sides of the tub out of the way, *vide* the dotted lines Fig. 2, and so that when the machine is not in use for washing, the lids may be again turned up and over so as to cover the open top of the tub and render the machine suitable for use as a sideboard, table or the like, upon the removal of the handle.

The most efficient action is obtained with such machine by reciprocating the dasher, in each extention rotating the same about three-quarters of a revolution.

The said machine may be modified by making the vessel or tub of a cylindrical or other shape in plan, by corrugating its inner surface, by making the vanes of the dasher of a convex, concave or angular formation, and by perforating the same; but I believe the construction hereinbefore firstly described to be the best having regard to the specified object of the invention.

There may be detachably or otherwise applied to the machine a simple wringing or mangling attachment in which the upper roller is held to the lower one by the tension of suitably arranged spiral springs, or any other suitable wringing or mangling attachments may be detachably or otherwise fitted to one side of the tub.

Having now particularly described and ascertained the nature of the said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. The improved washing machine, usable also as a sideboard, table or the like, hereinbefore described with reference to the accompanying drawings.
2. The improved formation of the dasher hereinbefore described with reference to the accompanying drawings.
3. The several modifications hereinbefore specified.

Dated this 22nd day of February 1893.

DAY, DAVIES & HUNT,
281, High Holborn, London, W.C., Agents for the Applicant.

London: Printed for Her Majesty's Stationery Office, by Darling & Son, Ltd.—1893

[This Drawing is a reproduction of the Original on a reduced scale.]

FIG. 1.

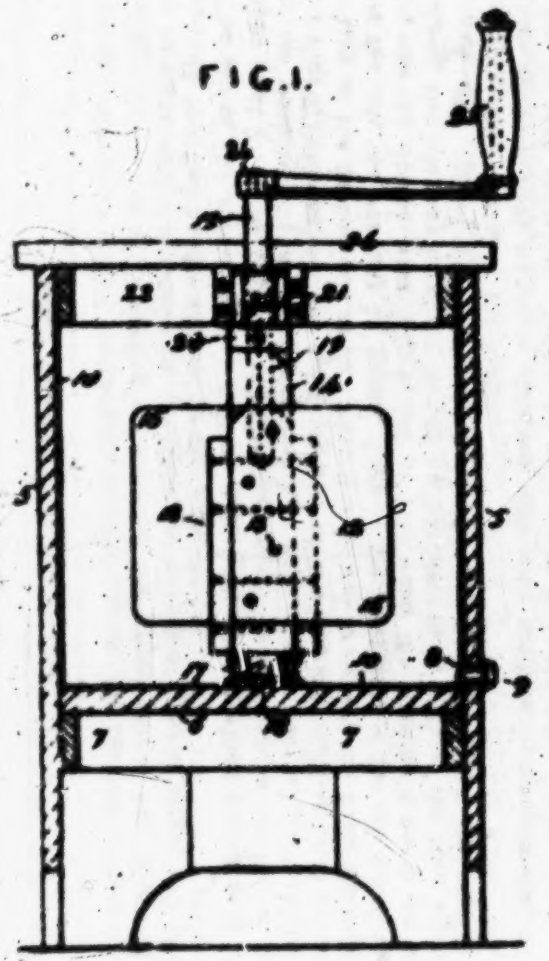


FIG. 2.

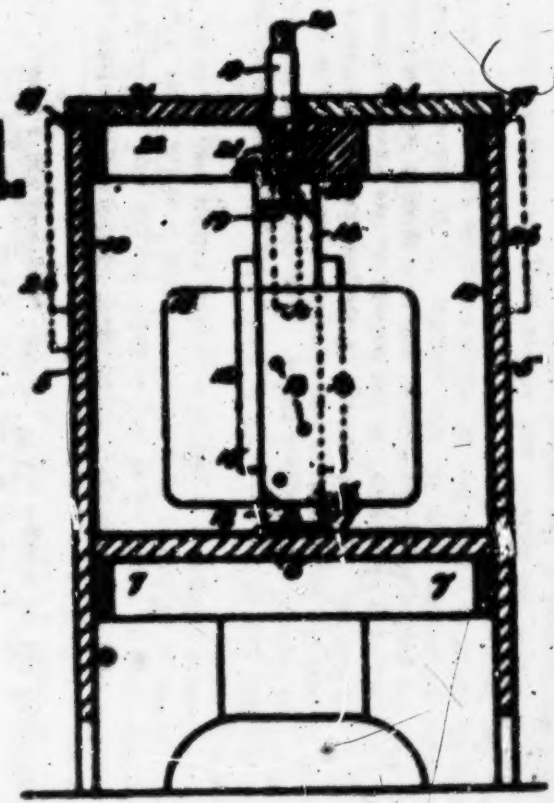
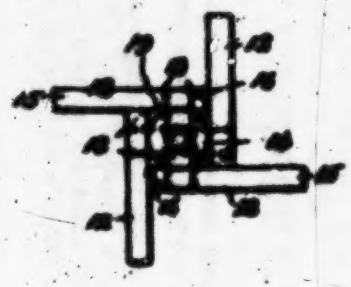


FIG. 4.

FIG. 3.



A.D. 1902. Oct. 31. N°. 19,866.

HAUSER'S Compound Specification.

N° 24,494 A.D. 1895

Date of Application, 31st Dec., 1895—Accepted, 1st Feb., 1896

COMPLETE SPECIFICATION.

An Improved Washing, Wringing, and Mangling Machine.

We, GEORGE DAVIES, of No. 22 Moira Street, Cardiff, in the County of Glamorgan, Blacksmith, GEORGE SHEPHERD, of the South Steam Joinery, Croft Street, Cardiff, in the County of Glamorgan, Contractor, and DAVID SHEPHERD, of No. 1 Frederick Street, Cardiff, in the County of Glamorgan, Chartered Accountant, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

Our invention relates to an improved washing, wringing and mangling machine which will hereinafter be set forth with reference to the accompanying drawings, wherein

Figure 1 is a side elevation of the machine, shown partly in section.

Figure 2 is an end elevation of the same.

Figure 3 is a section taken on the line 3—3 of Figure 1, showing the bearings and adjusting device for the rollers.

Figure 4 is a section on the line 4—4 of Figure 2 also showing the said bearings and adjusting device.

Figure 5 is a section taken on the line 5—5 of Figure 3.

Figure 6 is a section taken on the line 6—6 of Figure 1, showing the vanes employed in the washing operation.

Figure 7 shows an elevation of the projecting prongs which may be employed instead of the vanes; and

Figure 8, a plan of the same.

In these several figures similar letters of reference designate corresponding parts of the machine.

E is the trough wherein the clothes are to be washed; F, the revolving vanes or prongs; G, a vertical spindle; I, a bearing; H, J, mitre gears; K, a horizontal spindle; L, a handle thereon; M, another spindle; N, a cranked handle; and O, an additional bearing.

P, P, are long uprights carrying the end of the trough; Q, Q, the wringing and mangling rollers; R, a cranked handle; S, a cross piece forming a box; T, T, short uprights supporting the said trough; U, a shelf; V, V, spur gears; W, W, indiarubber blocks, Y, a screw, and Z, a fixed nut.

Our improved washing, wringing and mangling machine possesses a rectangular trough E supported by four uprights P, T. This trough is furnished with a hinged cover in the middle of which we arrange a bearing I adapted to support a vertical spindle G extending downwards into the trough and having fixed to it either a pair of crossed arms or vanes F, as shown in Figure 6, or a cross-piece furnished with four or more prongs F, as shown in Figures 7 and 8. At its upper end, the said spindle receives outside the trough a mitre gear H gearing with another mitre gear J fixed upon a horizontal spindle K which is held in a bracket on the top of the said cover, and to which a handle L of convenient length is attached; so that when the handle is rocked to and fro, the before mentioned vanes or prongs F will perform a partial revolution. In the event of a complete revolution of the vanes or prongs F being required, a horizontal spindle M of greater length than the aforesaid spindle K, may be employed, such spindle being supported in two bearings (an additional bearing O being then provided), and carrying a crank-handle N, as indicated in dotted lines in Figure 1.

[Price 6d.]

Two of the before mentioned uprights, P, are prolonged to a certain height above the top of the washing trough. These uprights are furnished with slots through which extend the journals of a pair of rollers Q used at will either for mangling or wringing. The journals of one of the rollers are adapted to receive handles K whereby the rollers are revolved in the usual manner. When this part of our invention, is to be used as a mangle, we may, if necessary, secure two spur gears V upon the journals of the pair of rollers Q as indicated in dotted lines in Figure 2. In proximity to these rollers, we provide a shelf U upon which the clothes are placed ready for mangling or wringing.

Upon each of the bearings X which receive the journals of the top roller there is arranged an indiarubber block W which acts as a spring and allows for the unevenness of the materials which are being passed between the rollers. A screw Y and fixed nut Z serve for applying the necessary pressure to the back of the indiarubber block W. The slot which receives the latter is enlarged so as to allow of the lateral expansion of the rubber under compression.

The tops of the uprights are connected by cross pieces which form a box S furnished with a hinged cover and designed for the reception of any necessary tools or materials.

The clothes to be washed are placed in the trough E around the vanes or prongs F, so that when these are operated, the clothes will be continually moved to and fro and squeezed or rubbed against the sides of the trough; the cleansing being performed by this means in a more perfect way than by the mechanical arrangements hitherto employed. Instead of imparting a rocking motion to the vanes or prongs, they may also be revolved a certain number of times in one and then in the other direction. The wringing and mangling operations take place in the customary manner.

Having now particularly described and ascertained the nature of our said invention, and in what manner the same is to be performed, we declare that what we claim is:—

1. A washing, wringing and mangling machine, in which the washing operation is effected by means of vanes or prongs F which when a partial or complete revolving movement is imparted to them, will squeeze or rub the clothes against the sides of the washing trough E, as herein set forth.

2. In a washing, wringing and mangling machine, the combination, with rectangular washing trough E, of vanes or prongs F on a vertical spindle G supported by the cover of the trough, bevel wheels H J, spindle K or M and a handle L or N, as herein set forth and shown in the accompanying drawing.

3. In a washing, wringing and mangling machine the combination, with a washing trough, of uprights P provided with slots, wringing and mangling rollers Q with journals held in bearings arranged in the said slots, and elastic indiarubber blocks W with adjusting devices Y Z, as herein set forth and shown in the accompanying drawing.

4. A washing, wringing and mangling machine, as herein set forth and shown in the accompanying drawing.

Dated this 21st day of December 1895.

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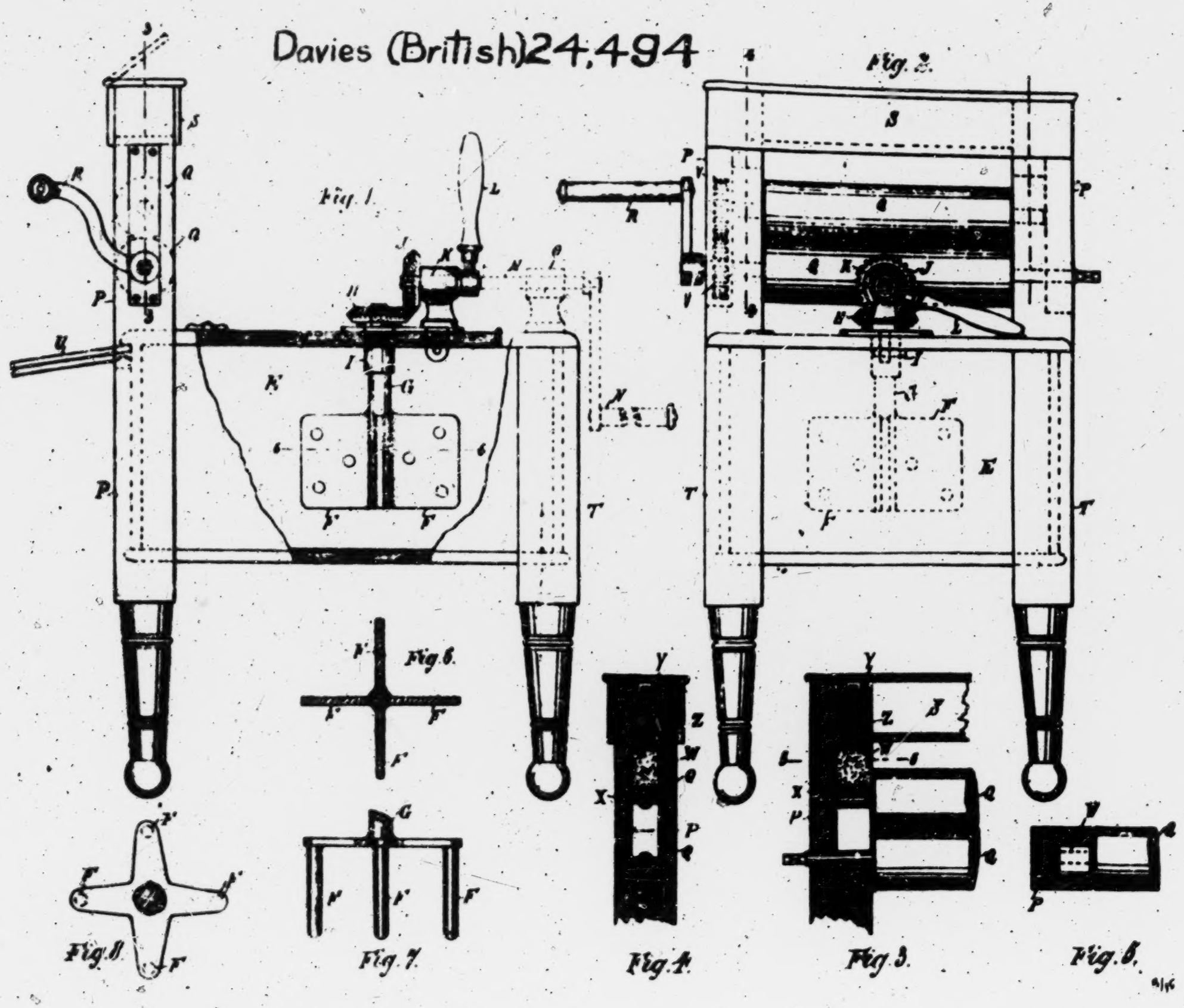
Davies (British) 24,494



Translation of

French Patent No. 365,614.

XVI. Clothing Industries.

5. Ironing, cleaning and pleating.

Washing machine of the hand-operated or motor-driven type.

E.F.Hemin and A.H.Bougrand, residing in France.

Date of application: Feb. 20, 1906.
Date of allowance: May 7, 1906.
Date of publication: Aug. 2, 1906.

This washing machine is designed so that the agitator which is vertically disposed in the tub is given an oscillatory motion by manually-operated or power-driven means, as may be required, operation of the washing machine by either of these two means being such that there is no necessity for dismounting any of the component parts since all that is needed is to operate a cluton when power is used or attach a handle when manual operation is contemplated.

The construction and operation of this washing machine will be readily understood by reference to the following description and the drawings attached thereto.

Fig. 1 is a side elevation of the washing machine. Fig. 2 is a cross-section through the

tub, the power-transmitting means not being shown. Fig. 3 is a view of the washing machine seen from below. Fig. 4 is a plan view (with the cover removed) and Fig. 5 is a cross-section through the upper part of the tub, the drain board and the cover being illustrated.

The machine comprises a tub a, made of hard wood, the interior of which is provided with ribbles b, and which is supported by four legs c, which can be made of wood, iron, cast-iron, etc., and may be provided with lugs for securing the washing machine firmly to the floor. The staves which constitute the tub are held together by four steel bands d, the uppermost of which is ribbed for the purpose of preventing any warping of the tub under the action of the detergent composition. The joints of the staves and the bottom are joined together to ensure perfect tightness and preclude any possibility of dislocation. At its lower part the tub carries a drain cock for drawing off the rinsing water or detergent solution after each run.

Extending upwardly into the tub through an opening in the center of the tub bottom is a copper tube g which carries at its lower end a flange f which is screwed to the outer surface of the tub bottom. This tube is intended

to act as a guide for the shaft i which extends inside of the sleeve g; for this purpose tube g carries two bronze bushings, g, h, one at its lower end and the other at its upper end. It will likewise be seen that this sleeve has the advantage of preventing access of water to the shaft i. The latter, of machined steel, extends above the top of the sleeve g and terminates in a squared end k; its lower end acts as a center-pivot, bearing upon a three-armed bracket n screwed onto the bottom of the tub.

Mounted upon the squared end k of the shaft i is a member known as an agitator, which comprises a disc l conforming to the inner diameter of the tub, a hollow wooden shaft m upon which is mounted a cast-iron member with a square socket corresponding to squared end k and carrying vanes and ribs radially arranged around the shaft m.

The disc l is constructed of a plurality of crossed wooden slats (Fig. 4) for the purpose of preventing warping by the hot water; intervening spaces o are left between these slats for the purpose of facilitating the circulation of the water or of the detergent solution; on its periphery the disc l carries a copper ring p of semi-cylindrical cross-section which fits the contour of the slats snugly

and covers the sharp edges or the ends of the slats. The hollow wooden shaft m is secured to the center or the disc l, with the shaft i and the outer sleeve g extending upwardly into the bore or the shaft m. Securely attached to the upper end of shaft m by means or screws and cooperating prongs extending into the wood is the cast-iron member q which carries a square-socketed bushing which fits exactly upon the squared end of shaft i. This cast-iron member is covered by a copper jacket r, a screw s holding all these parts firmly together. Attached to these two principal members, viz., the disc l and the shaft m, by means or grooves and screws are the perforated ribs and vanes u for the circulation or the water. Copper screws or nails are preferably employed for securing together the various elements which make up the agitator for the purpose or preventing rust. Attached to the lower part or the shaft i by means or a cotter pin is a cast-iron member v to which is pivoted at x a fork y which is connected to a crank z by means or the connecting rod a'. The relative lengths or the elements v, y, z are calculated in such a way that during each turn or the crank z there is imparted

to the element y and hence also to the shaft i, an oscillatory motion equal to one-third of a turn in each direction. At each end of the stroke the element y engages the spring-controlled stops b' which act as shock absorbers.

The machine is started by rotating the fly wheel a' with the crank handle e', the rotary motion being transmitted by means of the two bevel gears f' and g' and the shaft h' to the crank z. A ball bearing i' minimizes friction. The entire drive mechanism is mounted upon a cast-iron bracket k' bolted to the tub.

A movable board l' serves as a drain for the wet linen or to hold the soap, etc., while at the same time it acts as a cover for the tub; a cover m' closes off the other part of the tub.

For the purpose of employing a power drive, the shaft of the fly wheel is extended and fitted with two pulleys, one of which, n', is secured to the fly wheel, the other o' is an idler.

The dimensions of these pulleys are such that it is always possible to actuate the machine

either by hand or by power, by removing the belt or the crank handle, respectively. The belt shifting gear mechanism is attached to the end of the shaft by means of a stud bolt, being simply an angle bracket provided with a fork and lever.

Resume.

This invention relates to an improved laundry washing machine which can optionally be operated manually or driven by mechanical power, and which has the following characteristic features:

1) An oscillatory motion is imparted to the bottom winged disc by means of a crank and a pitman for the purpose of giving this disc a stroke in each direction equal to one-third of a turn of the crank.

2) A shock absorbing device for facilitating the reversal of direction at each end of each stroke, said device comprising two spring-controlled stops engaged by the crank mounted upon the agitator shart.

3) The actuation of the agitator by hand or by mechanical power by means of a belt-shifter or by a removable crank on the fly wheel

which, through the intermediary of two bevel gears, a vertical shaft and a crank, transmits the motion to the pitman which actuates the agitator.

4) An interior disc comprising crossed wooden slats, in combination with wings and ribs, for the purpose of preventing the batch of linen from becoming packed at the bottom of the tub.

5) The arrangement of the means for imparting motion to the agitator, on the underside of the tub for the purpose of leaving free the upper part of said tub so as to permit of placing into the latter sheets and linen pieces of large dimensions.

Henin & Bougrand

By power of attorney.

Armengaud Jeune.

RÉPUBLIQUE FRANÇAISE

OFFICE NATIONAL DE LA PROPRIÉTÉ INDUSTRIELLE.

BREVET D'INVENTION.

XVI. — Habillement.

5. — Passages, nettoyage et repassage.

N° 363.095

Laveuse pour le linge fonctionnant à bras ou au moteur à volonté.

MM. Eugène-Félix HÉNIN et Arthur-Hippolyte BOUGRAND résidant en France.

Demandé le 20 février 1906.
Délivré le 7 mai 1906. — Publié le 2 août 1906.

Cette laveuse pour le linge est disposée de telle façon que l'agitateur disposé verticalement dans la cuve contenant le linge à laver reçoit un mouvement de va-et-vient sous l'action d'une commande à la main ou bien d'une commande mécanique suivant le cas, le fonctionnement de la laveuse sous l'action de l'une ou de l'autre de ces commandes pouvant avoir lieu sans qu'on ait besoin de démonter aucune pièce, puisqu'il suffit d'agir sur un débrayage et de mettre en place la manivelle pour la commande à bras ou de la retirer.

La combinaison et le fonctionnement de cette laveuse seront bien compris par la description qui va suivre en regard du dessin annexé :

La fig. 1 est une élévation de la laveuse; la fig. 2 est une coupe verticale de la cuve, les organes de transmission de mouvement étant supposés enlevés; la fig. 3 est un plan par-dessous de la laveuse; la fig. 4 en est un plan par-dessus, le couvercle n'étant pas figuré et la fig. 5 est une coupe de la partie supérieure de la cuve montrant bien la tablette servant à égoutter le linge, et le couvercle.

L'appareil se compose d'une cuve en bois dur *a*, dont l'intérieur possède des cannelures *b*, montée sur quatre pieds *c*, pouvant être en bois, fer, fonte, etc., munis ou non de roulements ou équerres pour les fixer en sol. Les douves formant la cuve sont maintenues par quatre cercles en acier *d* dont le supérieur est serré, dans le but d'empêcher toute déformation de la cuve sous l'action de la lessive. Les joints des douves et du fond sont heureusement, pour assurer une étanchéité parfaite et supprimer tout risque de déformation. A sa partie inférieure la cuve possède un robinet de vidange pour l'écoulement de l'eau ou de la lessive après chaque opération.

A l'intérieur et, par un trou pratiqué au centre de la cuve s'élève un tube en cuivre *e*, pourvu inférieurement d'une collerette *f*, vissée extérieurement sur le fond. Ce tube est destiné à guider l'axe *i* qui est à l'intérieur; dans ce but, il possède deux bagues en bronze *g*, *h*, l'une à sa partie inférieure, l'autre à sa partie supérieure. On voit également que ce tube a l'avantage d'éviter que l'eau et la lessive ne viennent en contact avec l'axe *i*. Cet axe *i* en fer tourné dépasse le tube *e* par sa partie supérieure, terminée par un carré conique *k*; par sa partie inférieure formant pivot, il repose sur un support à trois branches *n* qui est vissé sur le fond de la cuve.

C'est sur le carré *k* de l'axe *i* que se monte la pièce dénommée agitateur, qui se compose d'un plateau *l* approprié au diamètre intérieur de la cuve, d'un axe *m* en bois creux sur lequel est montée une pièce en fonte portant un carré correspondant au carré *k*, et d'ailettes et tenons disposés radialement autour de l'axe *m*

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Prix du fascicule : 1 franc.

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Le plateau *l* est constitué par des lamelles de bois disposées en croix, comme le montre bien le plan (fig. 4) pour éviter la dilatation que pourrait produire l'eau chaude; des espaces *o* sont ménagés entre ces lamelles pour faciliter la circulation de l'eau ou de la lessive; à sa périphérie, le plateau *l* porte un cercle de cuivre *p* de section demi-cylindrique qui en épouse la forme et supprime les arêtes des rencontres des lamelles. C'est au centre du plateau *l* qu'est fixé l'axe en bois creux *m*, traversé par l'axe *i* et le tube *o*. A sa partie supérieure est montée très solidement, à l'aide de vis soulagées par des nervures pénétrant dans le bois, une pièce de fonte *q*, possédant un carré qui s'adapte exactement sur le carré *k* de l'axe *i*. Cette pièce en fonte est recouverte d'une enveloppe en cuivre *r*, une vis *s* solidarise le tout. Sur ces deux pièces principales, plateau *l* et axe *m*, sont montés à rainures et à vis des tenons et des ailettes *u* munies de trous pour la circulation de l'eau. Toutes les différentes ensembles de pièces en bois composent l'agitateur, en remplaçant des vis ou des chevilles en cuivre, pour éviter la rouille.

A la partie inférieure de l'axe *i* est goupillée une pièce en fonte *v* articulée en *x* après une fourche *y* réunie à une manivelle *z* à l'aide d'une bielle x^1. Les rapports des pièces *r*, *y*, *i* sont calculés de façon que chaque tour de manivelle *z* anime la pièce *v* et par conséquent l'axe *i*, d'un mouvement de va-et-vient égal à 1/3 de circonférence dans chaque sens. A chaque fin de course, la pièce *v* se trouve en contact avec des taquets à ressorts b^1, qui facilitent le retour sans choc.

Le mouvement initial est donné par le volant d^1 muni de la manivelle e^1, et transmis par deux pignons d'angle f^1, g^1 et l'arbre h^1 à la manivelle *z*. Un roulement à billes j^1 adoucit le frottement. Le tout est monté sur une pièce en fonte k^1 boulonnée sur la cuve.

Une tablette *t* mobile sert à égoutter le linge, à placer le savon, etc., tout en couvrant la cuve; un couvercle w^1 complète la fermeture.

Pour la marche au moteur, l'axe du volant est prolongé et muni de deux poulies; l'une n^1 est solidaire du volant, l'autre o^1 est folle.

Les dimensions de ces poulies sont telles qu'il est toujours possible d'actionner l'appareil soit à la main, soit au moteur, en enlevant la courroie ou la manivelle. Le débrayage se fixe sur le bout de l'axe par un prisonnier, c'est simplement une équerre munie d'une fourche et d'une manette.

Résumé.

Cette invention concerne une laveuse perfectionnée pour le linge qui peut à volonté fonctionner à bras ou à moteur, et qui présente comme particularités distinctives essentielles :

1° La mise en mouvement de va-et-vient du plateau intérieur portant les batteurs au moyen d'une transmission par manivelle et bielle dans le but de donner à ce plateau une course dont chaque sens de 1/3 de circonférence par tour de l'arbre portant la manivelle.

2° Le dispositif amortissant les chocs et facilitant le changement de sens de marche à chaque fin de course, constitué par deux taquets à ressorts sur lesquels vient buter la manivelle montée sur l'arbre portant l'agitateur.

3° La commande de l'agitateur à bras ou au moteur par simple débrayage ou démontage de la manivelle d'un volant qui, par l'intermédiaire de deux pignons d'angle, d'un arbre vertical et d'une manivelle, transmet le mouvement à la bielle actionnant l'agitateur.

4° Le plateau intérieur constitué par des lamelles de bois croisées l'une sur l'autre, en combinaison avec des ailettes et des tenons, dans le but d'éviter le tassement du linge au fond de la cuve.

5° La commande de l'agitateur par le dessous de la cuve dans le but de rendre libre le dessus de cette cuve pour y placer des draps ou linges de grandes dimensions.

BENIN ET BOUGRAND

Par procuration

Signature illisible

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Imprimerie. — Paris, Imprimerie à la Société BENIN et Cie, 58, rue des Francs-Bourgeois, Paris (3e).

Fig 1

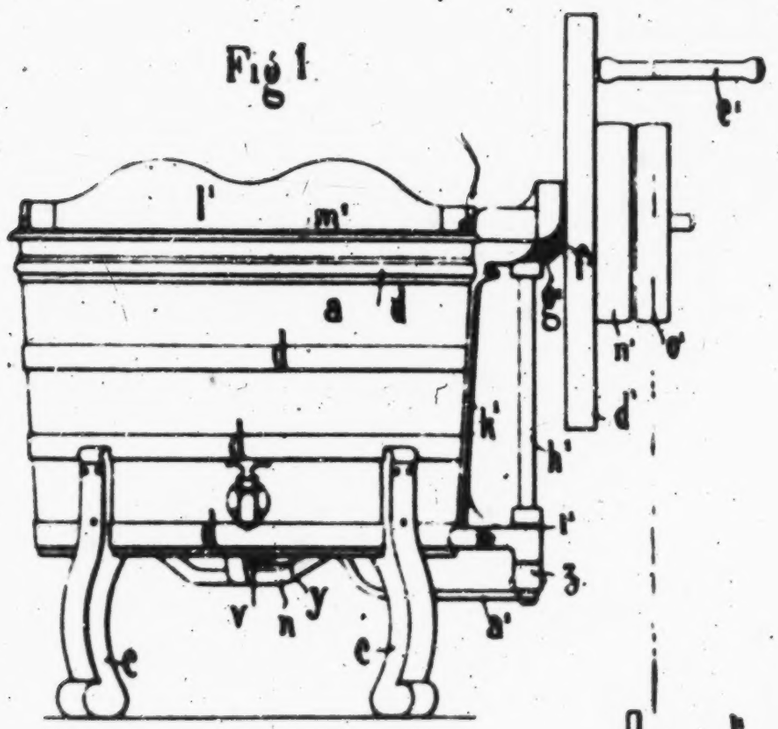


Fig 2

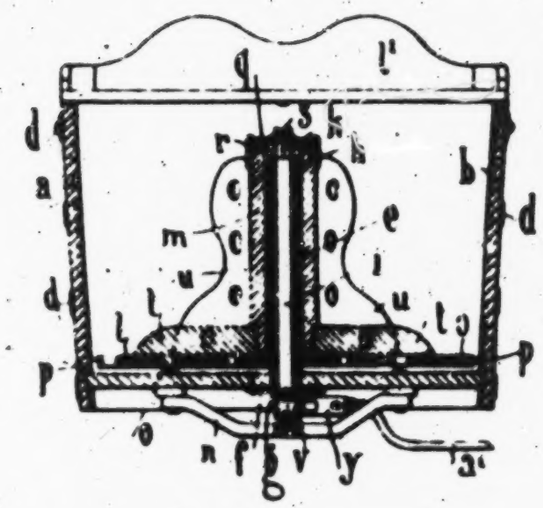


Fig.5

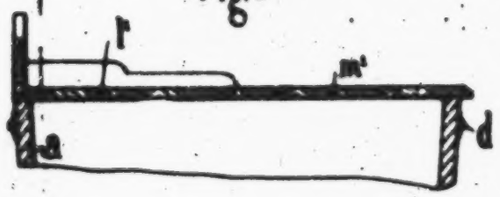


Fig.3

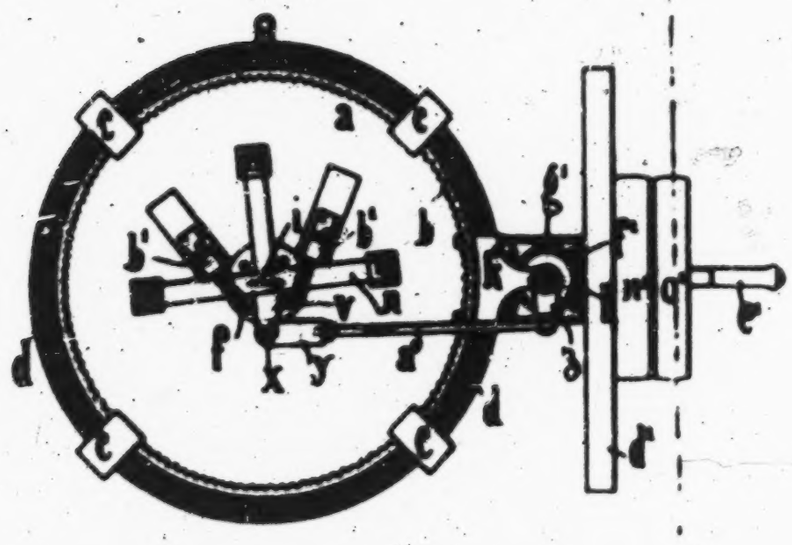
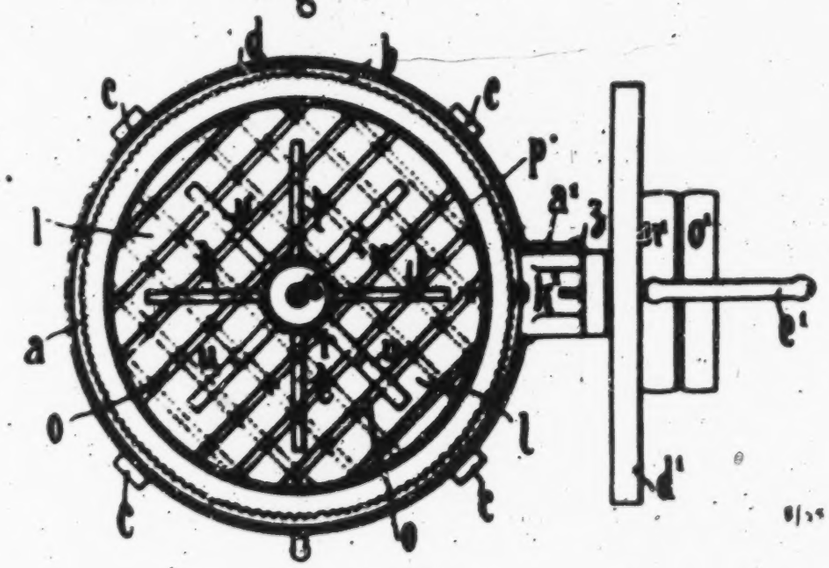


Fig.4



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TRANSLATION

French Patent No. 398,798.
XVI. Clothing Industries.
5. Pleating, Cleaning & Ironing.

Washing Machine.

L. Versaille and F. Veresvel, residents of France (Nord).

Patent applied for Jan. 13, 1909.
Patent granted Apr. 2, 1909.
Patent published June 14, 1909.

The present invention relates to a new washing machine, in which the articles do not occupy the same position in the tub as in former machines. This change is intended to prevent any injury to the articles during the washing operation and to make the work easier and, especially, more perfect. In fact, whereas in similar machines the articles to be washed remain at all times in the bottom of the tub, here, on the contrary, they are placed between the inner side wall of the tub and the specially designed agitator, which turns uniformly.

The accompanying drawing illustrates in Fig. 1 a cross-section of the machine.

Fig. 2 is a plan view thereof.

Fig. 3 is a side view of the agitator, and

Fig. 4 is a plan view thereof.

The machine comprises essentially a hollow

center column 1 (Figs. 1 and 2) made of a non-oxidizable metal and having a bore at its upper end serving as a bearing for the vertical shaft 2. This shaft 2 is provided with a square upper end 3 for carrying during its rotation the agitator 3'; its lower end rotates in the step-bearing 4, which is carefully socketed to procure uniform rotation. The upper end of the bearing 4 carries a washer 5 for attaching it to the tub, the hole in the washer 5 corresponding exactly to the diameter of the lower end of the center column. This washer 5 is perforated to receive the bolts for securing it to the tub 6, these bolts also securing the washer 7, which is made integral with the column 1, upon the inner surface of the tub bottom.

The vertical shaft 2 carries a pinion 8 at its lower end to which is imparted an alternating movement rotating from left to right and from right to left, by means of a toothed sector 9 integral with a piece 10 which pivots about an axis of rotation 11 located beneath the tub. This axis 11 is held fixed by a bracket 12 having an upper flange secured to the bottom of the tub.

The curved end of the piece 10 opposite the toothed sector 9 is provided with round studs 13 arranged concentrically with the shaft 11. These

studs serve as gear teeth continuously engaging a pinion 14 which is rotated by a shaft 15 actuated manually by a wheel 16 provided with a handle 17 convenient to the operator. The lower end or this shaft 15 engages a groove 18 provided in the piece 10. This groove, which is curved and likewise concentric with the shaft 11, accordingly defines a track along which the end of shaft 15 moves more or less rapidly, depending upon the speed at which the operator desires to drive the agitator. A support 19 steadies the shaft 15 while in motion and is provided at its lower end with a slot 20 so as to guide the shaft to the extreme position indicated by dotted lines in Fig. 1, which is the position that the shaft 15 occupies when the pinion 14 traverses the outside of the studs in the manner of gear teeth.

It should be noted that the traverse of the pinion along the outer faces of the studs procures rotation of the agitator in a direction opposite to that effected by the traverse of 14 with the inner faces of these studs; accordingly, a reversal in the direction of rotation of the agitator takes place after a slight pause when the pinion rounds the end studs. It should also be noted that the

travel of the pinion in each direction of rotation is calculated so as to cause the agitator to make exactly one revolution in each direction. This arrangement results in the stirring of each of the articles to be washed during each rotation of the agitator 5'.

This agitator 5', of special shape, comprises two plates between which are radially mounted a series of blades adapted to whip constantly the articles to be washed by projecting them against the side wall of the tub. The two agitator plates have central bores corresponding in diameter to that of the center column which acts as an axis therefor. The actuation of this agitator is effected by the rotation of shaft 4.

The mode of operation of the apparatus is as follows:

With the tub filled with water (hot) to a level slightly (below) above the center column, the articles to be washed are placed between the agitator and the side wall of the tub. A lid may cover the machine. The operator, by rotating the wheel 16 by means of the handle 17, rotates the pinion 14 in engagement with the upwardly projecting studs 13 along the curved track 18 to impart to the toothed sector a back-and-forth motion which is transmitted

to the pinion 8, which in turn causes the agitator 3' to turn alternately in one direction and then in the other, the agitator being actuated by the squared upper end of shaft 2. In turning, the agitator blades drive the articles to be washed laterally into frictional engagement with the tub wall, from which they rebound toward the agitator. In that way, a continuous friction is produced which results in a perfect washing action, with the expenditure of a minimum of physical exertion.

Summary

1) A washing machine arrangement, with means beneath the tub for actuating a vertical shaft turning in a center column, whereby interference and inconvenience while operating are avoided and the liability of oil splashing upon the articles during the washing operation is eliminated;

2) Alternating movement of rotation of the agitator first in one direction and then in another, obtained by means of a toothed sector and a grooved piece having studs projecting upwardly therefrom and serving as gear teeth. This movement is such that the agitator makes one complete revolution for each stroke of the sector;

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c) The arrangement of a simple agitator comprising plates and blades, adapted to rotate about a vertical axis to drive the articles to be washed against the wall, so that they are acted upon between the agitator and the tub;

d) The arrangement of the actuating means which can also be mounted in a self-evident manner above the tub. The dimensions of the agitator, the number and shape of the blades can be varied at will. It can be made in any material whatsoever, depending upon the nature of the articles to be washed.

L. Versaille and F. Versavel
By power of attorney
Jules Cantier.

RÉPUBLIQUE FRANÇAISE.

OFFICE NATIONAL DE LA PROPRIÉTÉ INDUSTRIELLE.

BREVET D'INVENTION.

XVI. — Habillement.

5. — Blanchissage, nettoyage et repassage.

AUG 24 1909

N° 398.798

chine à laver.

MM. Louis VERSAILLE et François VERSAVEL, résidant en France (Nord).

Demandé le 13 janvier 1909.
Délivré le 9 avril 1909. — Publié le 14 juin 1909.

La présente invention a pour objet un nouveau dispositif de machine à laver, dans laquelle les objets n'occupent pas la même position dans la cuve que dans les machines analogues connues jusqu'ici. Ce changement a pour but d'éviter toute détérioration des objets durant le lavage et de donner un travail beaucoup plus facile et surtout plus parfait. En effet, tandis que dans les machines similaires les objets à nettoyer sont constamment au fond de la cuve, ici au contraire ils sont placés entre la surface latérale intérieure de cette cuve et l'agitateur de forme spéciale, qui tourne d'un mouvement régulier.

Les dessins annexés représentent :

Fig. 1 : une coupe transversale en élévation de l'appareil.

Fig. 2 : une vue en plan de celui-ci.

Fig. 3 : une vue en élévation de l'agitateur.

Fig. 4 : une vue en plan de ce dernier.

La machine comprend essentiellement : fig. 1 et 2, une colonne centrale 1 en métal inoxydable avec chambre intérieure et alésée à son extrémité supérieure pour livrer passage à un arbre vertical 2. Cet arbre 2 porte à sa partie supérieure un carré 3 pour l'entraînement dans sa rotation de l'agitateur 3' ; sa partie inférieure tourne dans un support-crapaudine 4, alésé de façon à lui assurer un mouvement de rotation bien régulier. Ce support 4 porte à sa partie supérieure une rondelle 5 pour sa fixation sur la cuve, l'alésage de cette pièce 5 correspondant exactement au diamètre inférieur de la colonne centrale. Cette rondelle 5 est percée de trous livrant passage à des boulons pour sa fixation sur la cuve 6, boulons qui maintiennent également la rondelle 7 solidaire de la colonne 1, sur la surface interne du fond de la cuve.

L'arbre vertical 2 porte à sa partie inférieure un pignon 8 qui reçoit un mouvement de rotation, alternativement de gauche à droite et de droite à gauche, au moyen d'un secteur denté 9 solidaire d'une pièce 10 qui se meut autour d'un axe de rotation 11 placé sous la cuve. Cet axe 11 est maintenu par un support 12 dont la partie supérieure en forme de chapeau se fixe sous la cuve.

La partie de la pièce 10, opposée au secteur denté, épouse une forme circulaire avec tétons cylindriques 13 disposés concentriquement à l'axe 11. Ces tétons forment office de directeur travaillant constamment avec un pignon denté 14 qui reçoit son mouvement de rotation d'un arbre 15 qui est mû à la main au moyen d'un volant 16 muni d'une poignée 17 que l'ouvrier a à sa portée. L'extrémité inférieure de cet arbre 15 est engagée dans une rainure 18 pratiquée dans la pièce 10. Cette rainure qui est de forme circulaire également concentrique à l'axe 11 détermine ainsi un chemin que parcourt plus

Prix du fascicule : 1 franc.

ou moins vite l'extrémité de l'arbre 15, selon la vitesse que l'ouvrière veut imprimer à l'agitateur. Un support 19 maintient l'arbre 15 dans son mouvement et porte une coulisse 20 à sa partie inférieure de façon à le guider jusque dans sa position extrême représentée en pointillé dans la fig. 1, position que l'arbre 15 occupe quand le pignon 18 travaille à l'extérieur aux têtons faisant office de crémaillère.

Il faut remarquer que l'engrènement du pignon avec la face externe des têtons détermine un mouvement de rotation de l'agitateur inverse de celui provoqué par l'engrènement de 18 avec la face interne de ces têtons; il se produit donc un changement de sens de rotation après un léger repos de l'agitateur, quand le pignon se trouve en prise avec les deux têtons extrêmes. Il faut remarquer en outre que la course du pignon pour chaque sens de rotation est calculée telle que l'agitateur fait exactement un tour pour chacun des deux sens. Cette disposition a pour effet de ramener toutes les pièces à laver à chaque rotation de l'agitateur 3.

Cet agitateur 3, de forme spéciale, comporte deux plateaux, entre lesquels sont disposées en croix une série d'ailes, ayant pour but de fouetter constamment les objets à laver, en les projetant contre la surface latérale de la cuve. Les deux plateaux de l'agitateur sont calculés au diamètre de la colonne centrale qui leur sert d'axe. L'entraînement de cet agitateur a lieu par la rotation de l'arbre 2.

Le fonctionnement de l'appareil est le suivant :

La cuve étant remplie d'eau (chaude), un peu au-dessus de la colonne centrale, les objets à laver sont placés entre l'agitateur et les parois latérales de la cuve. Un couvercle recouvre le tout en bronze. L'ouvrière mettant en mouvement la volant 16 à l'aide de la poignée 17, entraîne la rotation du pignon 18 qui engrenant avec les saillies en têtons 13 en parcourant le chemin circulaire 14, communique au secteur denté un mouvement de va-et-vient qui se transmet au pignon 4, lequel à son tour fait tourner dans un sens et dans l'autre alternativement l'agitateur 3 qui est entraîné par le carré que porte l'arbre 2 à sa partie supérieure. En tournant, les ailes de l'agitateur chassent les objets à laver tout en les frottant contre les parois de la cuve, qui à son tour les repousse vers l'agitateur. Il se produit de ce fait une friction continue déterminant un lavage parfait, tout en n'exigeant qu'une force très minime.

Résumé :

1° Dispositif de machine à laver, avec mouvement de commande transmis sous la cuve à un arbre vertical, tournant dans une colonne centrale, évitant par ce moyen tout encombrement et toute gêne durant le travail et supprimant ainsi tout danger de projections d'huile sur les objets pendant l'opération de lavage;

2° Mouvement alternatif de rotation de l'agitateur dans un sens et dans l'autre, obtenu à l'aide d'un secteur denté et d'une pièce ramenée avec têtons en saillies faisant office de crémaillère. Ce mouvement est déterminé d'une façon telle que l'agitateur fait exactement un tour pour chaque course du secteur;

3° Disposition d'un agitateur simple, composé de plateaux et d'ailes, ayant pour effet, pendant sa rotation verticale, de projeter contre les parois les pièces à laver qui sont ainsi travaillées entre l'agitateur et la cuve;

4° Disposition des organes de commande, pouvant être également placés de façon appropriée au-dessus de la cuve. Les dimensions de l'agitateur, le nombre et la forme des ailes peuvent varier à volonté. Sa construction peut être faite en n'importe quelle matière, suivant la nature des objets à lever.

L. VERSAILLE et F. VERSAVEL.

Par procuration
Jules Hirsch

C115

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N° 396.798 MM. Versailles et Verseval Pl. unique

Fig. 1

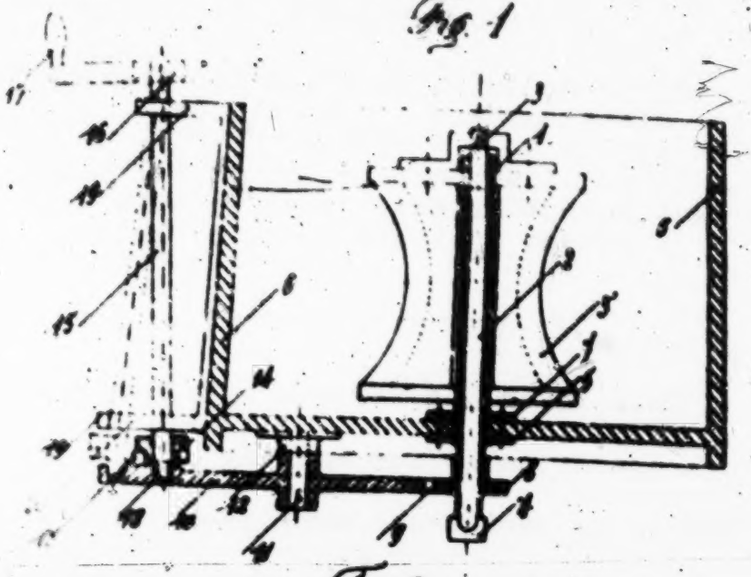


Fig. 2

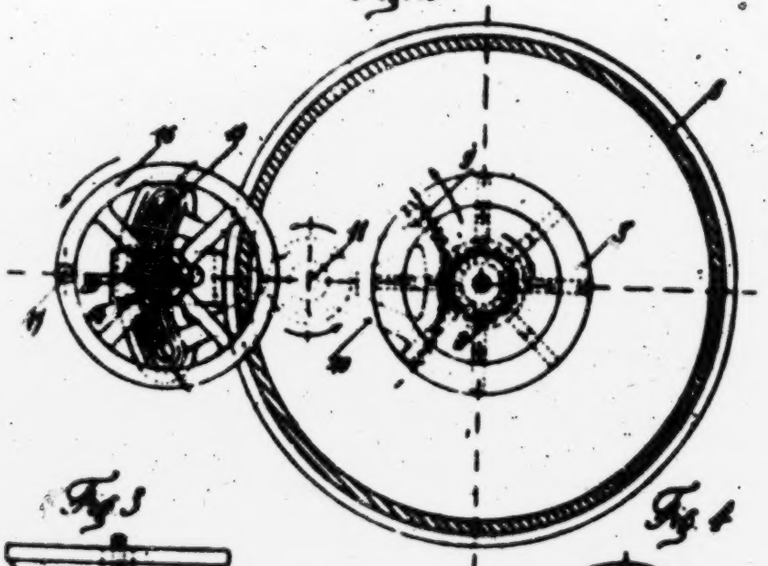


Fig. 3

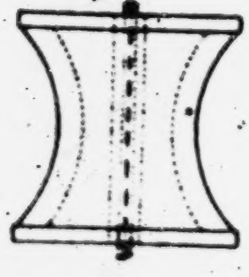
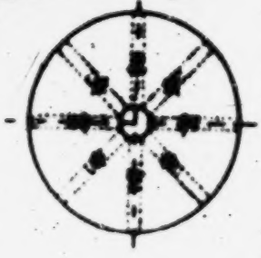


Fig. 4



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971

TRANSLATION

Patent No. 470,925 to E.E.Hershey
(French)

Improvements in Machines for Washing or cleaning, and drying dishes.

Application filed March 30, 1914
Patent granted June 27, 1914
Patent published Oct. 6, 1914.

This invention relates to a machine intended more specifically for washing or cleaning, and drying dishes, which comprises means arranged in the tub for forcibly impelling the water over the dishes with a circulatory movement in a closed circuit or vortex, and means for admitting air into said tub so as to prevent the formation in the latter of an air cushion which would impede or at least interfere with the free movement of the water, the air thus admitted being likewise utilized to assist in draining the dishes, and in cooling and drying them.

Fig. 1 represents in vertical cross-section, a machine for washing or cleaning and drying dishes, in accordance with the present invention.

Fig. 2 is a side view of the machine.

Fig. 3 shows the bottom partly in section,

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with the legs or the machine removed. 972

Fig. 4 is a perspective view of the bottom of the device.

Fig. 5 shows partly in side elevation and partly in vertical cross-section one detached part on an enlarged scale.

1 designates a tub, box or other suitable receptacle adapted to receive the dishes which are to be washed or cleaned and dried.

Located in the tub below the upper edge thereof, is the perforated diaphragm 2, the wall of said tub having an inwardly extending ledge 3 on which the diaphragm is supported. It will be seen that the upper part of the tub is adapted to receive water which can thus seek its way through the diaphragm into the tub while the diaphragm will also prevent the water from splashing upwardly when the machine is not being operated.

4 designates the bottom of the tub, which is in the form of a plate and has a recessed part forming a spout 5 and serving also as a settling and discharge compartment, as will be more specifically set forth below.

In the center of the said bottom and assembled therewith are the bearings 6 for shaft 7 which extends vertically through the bearings and centrally through an opening. The shaft carries at its upper

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end inside the tub a propeller 8 composed of a suitable number of vanes, two of which are shown in the present example.

A pinion 9 is secured to the lower end of the shaft and meshes with the toothed sector 10, which is arranged on the inner side of the plate 11. The latter is pivotally attached by means of a bolt or stud 6 to one of the arms 13 of the supporting element 14 which is secured to the bottom of the tub 1 by means of bolts 15, the arm 13 being likewise secured to the bottom of the tub by means of bolt 16.

Upon the support 14 are mounted retaining means 17 adapted to mount the legs 18 which support the tub 1 and other appurtenances of the machine.

The inner end of plate 11 carries a fork 19 into which freely fits a vertically extending rocker 20 which rises from the horizontally extending boss 21 through which passes the bolt 22 for connecting said boss to the brace 23, which is mounted on the wall of tub 1 and to one of the legs 18. Rising from said boss is the handle-receiving socket 24 which in the present case is integral with the boss 21 and the rocker 20, which members, being mounted on the bolt 22, are adapted to oscillate thereon, whereby the rocker 20 is adapted to im-

part rotary reciprocating motion to the toothed sector 10, the same being communicated to the pinion 9, shaft 7 and propeller 8.

Attached to the tub wall is a vertical passageway 25, said wall having therein the ports 26 and 27, the port 26 forming a communication for the upper portions of the interior of said passageway and the tub 1, and the port 27 forming a communication for the lower portion of the interior of said passageway and tub at the gutter 5. At the base of said passageway is a valve 28 whose seat is on said base, said valve being connected with the rod 29 which extends vertically through the passageway and is provided at its upper end with a lateral extension 30 which is adapted to be engaged by the cam 31 carried by the lever 32 on the top 33 of the passageway and adapted to roll on said top of the passageway, the rod being movable in an opening in said top, whereby, by operating the cam in one direction, the finger 30 and consequently the rod 29 are lifted, thus opening the valve 28, and permitting the fluid contents of the tub 1 to be discharged from the latter. When the cam is moved in the opposite direction, the valve is lowered, and consequently closed, the effect of which is evident.

Inside of the tub is a basket or cage 34, which rests upon the bottom 4 of the tub

and is adapted to hold the dishes, etc., to be washed or cleaned, and dried, preferably in an upright position.

By disconnecting the arm 25 from the vessel and leg, the boss 21, the rocker 20, the socket 24 and the handle 36 of the latter can be removed entirely from their positions and afterwards restored and reassembled by reapplying said arm, these two operations being carried out in a convenient manner.

The mode of operation is as follows:

The diaphragm is removed and dishes are placed in the basket 34. Water at a proper temperature is poured into the tub at the top thereof, said water then percolating from the diaphragm into the tub. The handle is thereupon operated whereby the rocker 20 reciprocates the toothed sector 10 and consequently also the pinion 9 and the propeller, the movements of the latter being rapid and powerful, whereby the water in the tub is forcibly whirled upwardly through the basket and then downwardly therefrom, some of it entering the port 26 and entering into the passageway 25, whereby it is redirected into the tub through the port 27 and drain spout b. At the same time the air within

the tube is aspirated through the top or the tub, and forced through port 26 into the passageway 25, from the latter through the port 27 into the tub, so as to circulate with the water and prevent the formation of an air cushion inside of the tub, with the result that the water circulates quite freely within the tub with a cyclone or whirlpool effect, in which condition it dashes against the dishes and flushes the same in both directions, thus washing and cleaning the articles in a complete and practical manner. After stopping the propeller the valve 28 is opened and the water and sediment accumulated upon the tub bottom 4 and in the drain spout 5 flow therefrom and drain through the spout into the passageway 25 and escape at said valve 28 through the open bottom of the passageway. The valve may then be closed, fresh water poured into the tub, and the propeller again operated, whereupon the dishes will be rinsed. Then the propeller is stopped and the valve opened, whereupon the rinsing water will be drained away. Then the valve is opened, the propeller started once more, whereby air is directed against the dishes, thus drying them.

As the water is originally supplied the tub at the top thereof, it escapes slowly through

the perforated diaphragm to the bottom of the tub, so that the propeller will have but a limited amount of water to raise at the beginning of its work, and so it may be started with ease and not against a load.

The retaining member 17, which is mounted on the arm 13 of the supporting element 14, extends downwardly through an orifice in the frame 11 carrying the toothed sector 10, whereby the latter may be oscillated or operated in opposite directions, without being interfered with by said retaining member, or the top or the leg attached thereto.

When the tub is first charged with water through the diaphragm 2, the air therein must be evacuated. For this purpose, the top 33 of the passageway 35 is perforated, as at 36, thus providing a vent, the purpose of which is self-evident.

Resume

The invention consists in a machine for washing, cleaning and drying dishes, this machine being essentially composed of a closed-bottom tub containing a propeller to which an oscillating movement is imparted and which forcibly dashes the water in the tub against the dishes placed therein.

The tub has a side passageway communicating with its interior, with a view to getting up within said tub a circulation of the washing-water, together with the atmospheric air.

The propeller-actuating mechanism comprises a toothed sector meshing with a pinion on the propeller shaft; to this toothed sector is imparted an oscillatory motion from a rocker which is actuated by a reciprocable handle.

Hershey

By power of attorney

Georges Fauge.

1279

RÉPUBLIQUE FRANÇAISE

OFFICE NATIONAL DE LA PROPRIETE INDUSTRIELLE.

BREVET D'INVENTION.

LIBRARY JUN 14 1915 U. S. PATENT OFFICE

IX. — Matériel de l'économie domestique.

1. — Appareils de service

N° 470.923

Perfectionnements aux appareils à laver ou nettoyer et sécher la vaisselle.

M. Emanuel Ewald HERSHEY résidant aux États-Unis d'Amérique.

Demandé le 30 mars 1914, à 14h 55m, à Paris.
Délivré le 27 juin 1914. — Publié le 6 octobre 1914.

Cette invention se rapporte à un appareil destiné plus spécialement à laver ou nettoyer et sécher la vaisselle, lequel comprend des moyens disposés dans le réservoir pour diriger de force l'eau contre la vaisselle avec un effet circulatoire en formant circuit ou tourbillons, et des moyens d'alimenter en air le dit réservoir de façon à empêcher la formation dans celui-ci d'un matelas, lequel retarderait ou interférerait aucun avec le mouvement non interrompu de l'eau, l'alimentation d'air étant également utilisée à égoutter, refroidir et sécher la vaisselle.

Fig. 1 représente une coupe verticale d'un appareil à laver, nettoyer et sécher la vaisselle, conformément à cette invention.

Fig. 2 représente une élévation latérale de cet appareil.

Fig. 3 représente une vue en plan du fond partiellement en coupe, les pieds de la machine étant enlevés.

Fig. 4 représente une vue perspective du fond du réservoir de l'appareil.

Fig. 5 représente une élévation latérale partielle et une coupe verticale partielle d'une partie détachée, à plus grande échelle.

1 désigne un baquet, boîte ou autre récipient approprié lequel est destiné à recevoir la vaisselle qui doit être lavée ou nettoyée et séchée.

Dans le dit récipient sous le bord supérieur de celui-ci se trouve le diaphragme perforé 2, la paroi du dit récipient présentant un rebord interne 3 sur lequel le dit diaphragme est supporté, et on remarquera que la partie supérieure du récipient est destinée à recevoir de l'eau qui peut passer à travers le diaphragme dans l'intérieur du récipient, alors que le dit diaphragme empêchera l'eau d'éclabousser vers le haut lorsque l'appareil n'est pas en fonctionnement.

4 désigne le fond du récipient lequel affecte la forme d'une cuvette et présente une partie enfoncée formant gouttière 5 comme chambre de dépôt et d'échappement, comme il sera expliqué plus amplement ci-après.

Au centre du dit fond, et ensemble à celui-ci se présentent les pièces de support 6 pour l'arbre 7, lequel passe verticalement à travers les dites pièces et une ouverture dans le dit centre, le dit arbre portant, ensemble à lui en son extrémité supérieure, laquelle se trouve à l'intérieur du dit récipient, le propulseur 8, qui est composé d'un nombre approprié d'ailettes, dont deux sont représentées dans le présent exemple.

A la partie inférieure du dit arbre est ensemble le pignon 9 avec lequel engrène le secteur denté 10, qui est disposé sur la face interne du châssis 11, lequel est ensemble par pivotage au moyen du boulon ou bouton 8, à l'une des ailes 13 du support 14, lequel est fixé au fond du récipient 4 par les boulons 15.

Prix du fascicule : 1 franc.

l'arbre 13 étant également fixé à la partie inférieure de la paroi du dit récipient par le boulon 16.

Sur le support 14 sont ménagées des encoches de retenue 17 qui sont destinées à recevoir les pieds 18 lesquels supportent le récipient 1, et d'autres accessoires de l'appareil.

L'extrémité interne de la pièce 11 porte la bifurcation ou fourche 19 dans laquelle est reçu librement le balancier disposé verticalement 20, ce dernier portant du bossage disposé horizontalement 21 à travers lequel passe le boulon 22 pour assembler le dit bossage au bras 23 qui est fixé à la paroi du récipient 1, et un des poids 18. Sur le dit bossage est montée la douille 24 qui reçoit la poignée, laquelle dans le présent cas est solidaire du bossage 21 et du balancier 20, lesquels organes, étant montés sur le boulon 22 sont destinés à osciller sur celui-ci par quoi le balancier 20 est destiné à imprimer des mouvements rotatifs alternatifs de va-et-vient au secteur 10, lesquels mouvements sont communiqués au pignon 9, à l'arbre 7 et au propulseur 8.

A la paroi du récipient est assemblé le canal vertical 25, laquelle paroi est percée des orifices 26 et 27, la lumière 26 formant une communication pour les parties supérieures de l'intérieur du dit canal et le récipient 1, et la lumière 27 formant une communication pour la partie inférieure des intérieurs du dit canal et récipient à la gouttière 5.

A la base du dit canal se trouve la soupape 28, dont le siège est disposé sur ladite base, la dite soupape étant assemblée à la tige 29, laquelle passe verticalement dans le canal et présente en son extrémité supérieure le doigt 30 lequel est destiné à être attaqué par la came 31 qui est montée sur l'oreille 32 sur le dessus 33 du canal et destinée à rouler sur le dit dessus, la tige étant mobile dans une ouverture dans le dit fond supérieur, par quoi en manœuvrant la came dans un sens, le doigt 30 et par conséquent la tige 29 se soulèvent, ouvrant ainsi la soupape 28, et permettant au contenu fluide du récipient 1 de s'échapper de ce dernier. Lorsque la came est manœuvrée dans l'autre sens, la soupape est abaissée, et par conséquent fermée, ce dont l'effet est évident.

A l'intérieur du récipient se trouve le panier ou la cage 34 lequel est supporté sur le fond 4 du récipient et sert à retenir la vaisselle, etc., à laver ou nettoyer et sécher, de préférence en une position verticale.

En désassemblant le bras 23 du récipient et pivot, le bossage 21, le balancier 20, la douille 24 et la poignée 35 de cette dernière peuvent se retirer complètement de leurs positions et ensuite se remettre en ne réassemblant, ou réappliquant le dit bras, ces deux opérations se faisant d'une manière appropriée.

Le fonctionnement est le suivant :

Le diaphragme est enlevé et la vaisselle est placée dans le panier 34. De l'eau à température convenable est introduite dans le récipient par le haut de celui-ci, cette eau passant alors du diaphragme dans le corps du récipient. La poignée est maintenant manœuvrée par quoi le balancier 20 déplace d'un mouvement alternatif le secteur denté 10 et conséquemment le pignon 9 et l'hélice, le mouvement de cette dernière étant rapide et puissant, par quoi l'eau dans le récipient tourbillonne de force vers le haut à travers le panier et puis vers le bas, une grande partie pénétrant dans l'orifice 26 et dans le canal 25, par quoi elle est dirigée de nouveau dans le récipient à travers le canal 27 et la gouttière 5. En même temps l'air est aspiré par le haut du récipient et foulé à travers l'orifice 26 dans le canal 25 et de ce dernier à travers l'orifice 27 dans le récipient, de manière à circuler avec l'eau et empêcher la formation d'un matelas d'air à l'intérieur du récipient, grâce à quoi l'eau circule avec grande liberté dans le récipient avec un effet de cyclone ou de tourbillon, dans laquelle condition elle bute contre la vaisselle et balaye celle-ci dans les deux sens, lavant et nettoyant ainsi les articles d'une manière complète et pratique. Lorsque le fonctionnement de l'hélice est arrêté, la soupape 28 est ouverte, l'eau et les matières qu'elle a recueillies sur le fond 4 du récipient et dans la gouttière 5 s'écoule et passe par la gouttière dans le canal 25 et s'écoule en la dite soupape 28 par le fond ouvert du canal. Alors la soupape peut se fermer, de la nouvelle eau s'alimenter au récipient et l'hélice de nouveau mise en marche, lorsque la vaisselle sera rincée. Alors l'hélice est arrêtée et la soupape est ouverte, l'eau de rinçage s'écoulera. Puis la soupape est ouverte et l'hélice est mise en marche, par quoi l'air est dirigé contre la vaisselle, séchant ainsi celle-ci.

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Comme l'eau est alimentée primitivement au récipient par le haut de celui-ci, elle s'échappe lentement à travers le diaphragme perforé, au fond du récipient, de sorte que l'hélice ne devra fonctionner au début de son fonctionnement qu'une quantité limitée d'eau, et sans elle peut être mise en marche avec facilité et sans charge.

L'organe de retenue 17 qui est monté sur l'aile 13 de la pièce de support 14 traverse vers le bas une ouverture dans le pièce 11 du secteur denté 10, par quoi ce dernier peut osciller ou fonctionner dans des sens opposés, sans être interféré par le dit organe de retenue ou le haut du pied assemblé à ce dernier.

Lorsque le récipient est alimenté primitivement d'eau à travers le diaphragme 2, l'air contenu dans le premier doit être évacué. Dans ce but le haut 33 du canal 26 est percé d'une ouverture 36, laquelle forme évent, dont l'effet est évident.

nement.

L'invention consiste en un appareil à laver, nettoyer et sécher la vaisselle, cet appareil étant essentiellement composé d'un récipient à fond formé, à l'intérieur duquel une hélice est animée d'un mouvement de rotation alternatif de va-et-vient et projette de force de l'eau contenue dans ce réservoir sur la vaisselle y disposée.

Le récipient porte latéralement un canal en communication avec l'intérieur de celui-ci pour créer une circulation de l'eau employée au lavage avec de l'air atmosphérique dans le dit récipient.

Le mécanisme moteur de l'hélice comprend un secteur denté engrenant avec un pignon sur l'arbre de l'hélice, ce secteur denté reçoit un mouvement d'oscillation d'un balancier qui est mis en mouvement par une poignée à mouvement alternatif.

HERSHEY.

Par procuration
Georges Pastt.

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N° 470923 M. Barsby Pl. unique

Fig. 1.

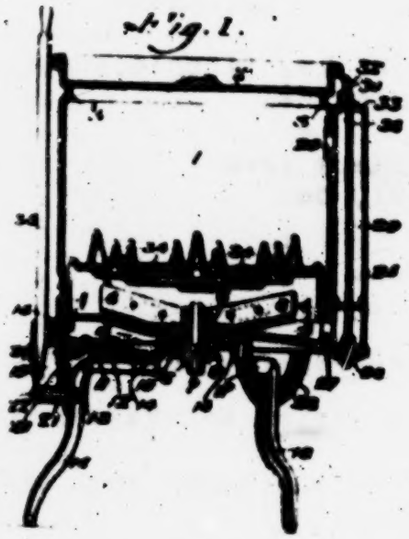

Fig. 2.

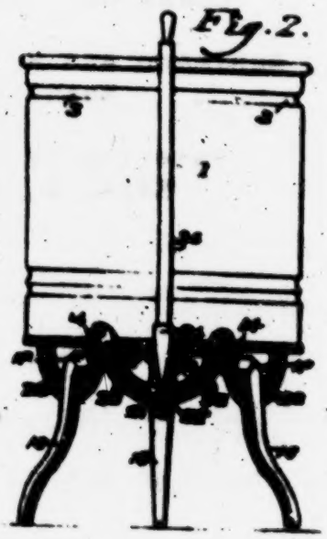

Fig. 3.

Fig. 5.

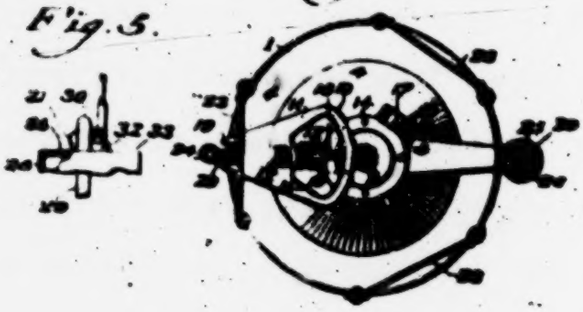

Fig. 4

Blue

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TRANSLATION

German Patent No. 62,444
Published May 25, 1902.

Class 34: Household Equipment.

C. Muhlmann and R. Schilke, Dippoldiswalde.
Washing Machine.

Patented in Germany from
Sept. 8, 1891, on.

The present washing machine is characterized in that in addition to the customary washing disc situated in the upper part of the tub, a second washing disc is provided in the bottom of the tub. This disc is oscillated in a direction opposite to that of the upper disc, and, like the upper disc, it can also be raised and lowered and is adapted to wash the clothes in the tub from below at the same time that the upper disc is working on the clothes from above.

The necessity of turning the clothes over for the purpose of working thereon from both sides and the consequent lost of time as is the case with former machines of similar construction, is avoided by the provision of the two washing discs.

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In the machine tub a, lined in the known way with corrugated sheet-iron, two washing discs are arranged, one at the tob b and one at the bottom c. The lugs or vanes b' of the upper disc are directed downwardly, while the vanes c'on the lower disc are arranged on the upper surface thereor, so that the vanes are directed toward each other. When both discs are oscillated in opposite directions, while the upper disc is raised and lowered, the articles of clothing between the discs are held by the vanes b' and c', and because of the opposite direction or rotation of the discs, are thoroughly agitated and cleansed simultaneously from above and below.

The following drive mechanism is employed for actuating the disc in the illustrated machine: Securely mounted on the shaft c^2 of the lower disc, which is sealed in the tub bottom by a stuffing-box d, is a spur gear e, and on the shaft b^2 of the upper disc is a spur gear f, which is non-rotatable but slidably mounted thereon. Meshing with these gears are the toothed sectors g and h which are mounted on the top and bottom of the tub, respectively. The toothed sectors are provided with arms i which are hollow and into which/ extend

the rods k in such a way as to be slidable and rotatable therein. The rods k are fitted at their ends with eyes through which extend the ends of the two-armed lever l which pivots on the bolt l^1 mounted on the wall of the tub. Overlying the lever l is a single-armed lever m which is pivoted on the yoke m^1, and which, during its oscillation, oscillates the lever l by means of the pin l^2 guided in the slot m^2, the said lever l thus causing the toothed sectors to oscillate in opposite directions. The up-and-down motion of the upper washing disc b is effected by the steep thread on the upper part of shaft b^2; a yoke n mounted on the lid of the tub a holds the corresponding nut. The lever or disc b can accordingly be adjusted by rotating the shaft b^2.

Instead of the driving mechanism described, other suitable arrangements of actuating means can be employed. Likewise, if desired, the lower disc c can be arranged to be raised or lowered during its rotation. Also, it is not necessary to place it in a well at the bottom of the tub in the manner illustrated, but this arrangement is adapted

to prevent the clothes from winding around the shaft c^2.

Patent Claim

A washing machine in which the articles or clothing in the wash tub are worked upon simultaneously from the top and from the bottom, by providing in addition to the upper washing disc b, which oscillates and is raised and lowered, a second washing disc c on the bottom of the tub, having upwardly extending vanes, which is oscillated in a direction opposite to the upper disc and which can, if desired, also be raised or lowered relatively to said upper disc.

Attached hereto one sheet of drawings.

Kaiserliches Patentamt
AUSGEGEBEN DEN 25. MAI 1892.

KAISERLICHES PATENTAMT.

PATENTSCHRIFT

— № 62444 —

KLASSE 34: Hauswirthschaftliche Geräthe.

CAMILLO MÜHLMANN und REINHOLD SCHILKE in DIPPOLDISWALDE.

Waschmaschine.

Patentirt im Deutschen Reiche vom 3. September 1891 ab.

Vorliegende Waschmaschine ist dadurch gekennzeichnet, dafs bei derselben aufser der üblichen, oben im Kasten befindlichen Waschscheibe noch eine zweite Waschscheibe im Grund des Kastens angeordnet ist. Dieselbe wird der oberen Scheibe entgegengesetzt abwechselnd gedreht, sie kann auch zugleich — wie die obere Scheibe — gehoben und gesenkt werden und hat den Zweck, die eingelegte Wäsche, welche die obere Scheibe von oben bearbeitet, zugleich von unten zu reinigen.

Ein Umlegen der Wäsche zwecks beiderseitiger Bearbeitung und der damit bei älteren Maschinen ähnlicher Bauart verbundene Zeitverlust ist durch die Anordnung zweier Waschscheiben vermieden.

In beiliegender Zeichnung stellt Fig. 1 den Längsschnitt, Fig. 2 die Oberansicht einer Ausführungsform der Maschine dar; Fig. 3 und 4 zeigen in gröfserem Mafsstabe den Antrieb der Waschscheiben.

In dem in bekannter Weise mit Wellblech ausgekleideten Kasten *a* der Maschine ist oben eine Waschscheibe *b*, unten eine solche *c* angeordnet. Während die Vorsprünge oder Knaggen b^1 der oberen Scheibe abwärts gerichtet sind, liegen diejenigen c^1 der unteren Scheibe auf deren oberer Fläche, sie sind also gegen einander gerichtet. Werden beide Scheiben in einander entgegengesetzter Richtung abwechselnd gedreht, wobei die obere Scheibe zugleich gehoben und gesenkt wird, so werden die zwischen den Scheiben befindlichen Wäschestücke von den Knaggen b^1 und c^1 erfafst, vermöge der entgegengesetzten Bewegung beider Scheiben energisch durchgewalkt und von oben und unten zugleich gereinigt.

Zur Bewegung der Scheiben dient bei der gezeichneten Maschine das folgende Getriebe. Auf der Achse c^2 der unteren Scheibe, welche durch eine Stopfbüchse *d* gegen den Kastenboden abgedichtet ist, sitzt fest das Zahntrieb *e*, auf der Achse b^2 der oberen Scheibe undrehbar, aber gegen die Achse verschiebbar das Trieb *f*. In diese Triebe greifen Zahnsectoren *g* und *h* ein, die auf dem Deckel bezw. auf dem Boden des Kastens gelagert sind. Die Zahnsectoren tragen die Arme *i*, welche hohl sind, und in denen Stangen *k* verschiebbar und drehbar sind. Die Stangen *k* tragen endseitig Oesen, in welche die Enden des zweiarmigen, um den an einer Kastenwand sitzenden Bolzen e^1 schwingenden Hebels *l* eingreifen. Ueber dem Hebel *l* liegend, ist an dem Bügel m^1 der einarmige Handhebel *m* gelagert, welcher bei seiner Hin- und Herbewegung durch den im Schlitz m^2 geführten Stift l^2 den Hebel *l* mitnimmt, der dann seinerseits die Sectoren zu schwingender Bewegung in einander entgegengesetzter Richtung veranlafst. Das Auf- und Abwärtsgehen der Waschscheibe *b* vermittelt das, auf dem oberen Theil der Achse b^2 befindliche steile Gewinde, ein auf dem Deckel des Kastens *a*

aufgesetzter Bügel a enthält die zugehörige Mutter. Die Höhenstellung der Scheibe b kann demnach durch Drehung der Achse b^2 geregelt werden.

Der beschriebene Antrieb kann durch eine andere geeignete Einrichtung ersetzt werden. Außerdem kann man, wenn gewünscht, auch die untere Scheibe c während ihrer Umdrehung sich heben und senken lassen. Dieselbe braucht auch nicht, wie gezeichnet, in einer Aussparung des Bodens liegen, welche Anordnung jedoch das Verwickeln von Wäschestücken mit der Achse c^2 verhindern soll.

PATENT-ANSPRUCH:

Eine Waschmaschine, bei welcher die in dem Waschgefäß befindliche Wäsche zugleich von oben und unten dadurch bearbeitet wird, daß außer der oberen, abwechselnd nach beiden Richtungen kreisenden und zugleich zeitweise gehobenen u. gesenkten Waschscheibe b noch eine zweite, mit ihren Vorsprüngen nach oben gerichtete Waschscheibe (c) auf dem Boden des Waschgefäßes angeordnet ist, welche der oberen Scheibe entgegengesetzt abwechselnd gedreht wird und gewünschtenfalls auch gegen dieselbe gehoben und gesenkt werden kann.

Hierzu 1 Blatt Zeichnungen.

CAMILLO MUHLMANN und REINHOLD SCHILKE
in DIPPOLDISWALDE.

Fig. 1.

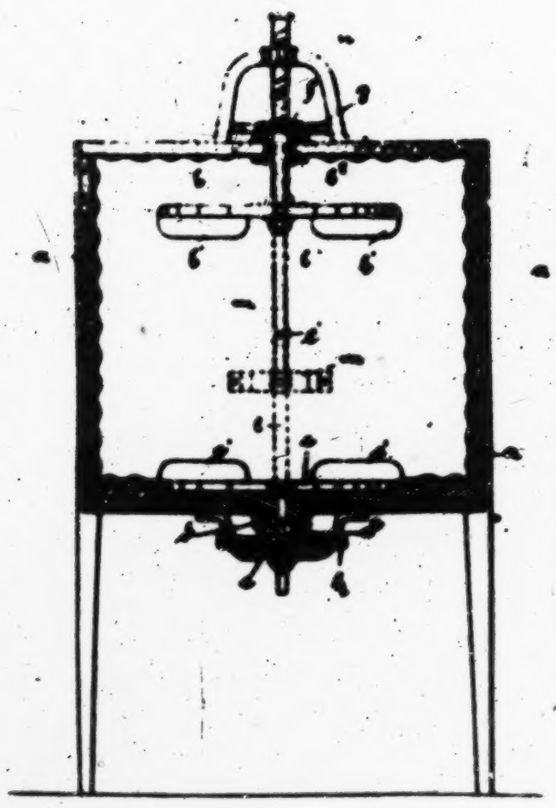


Fig. 2

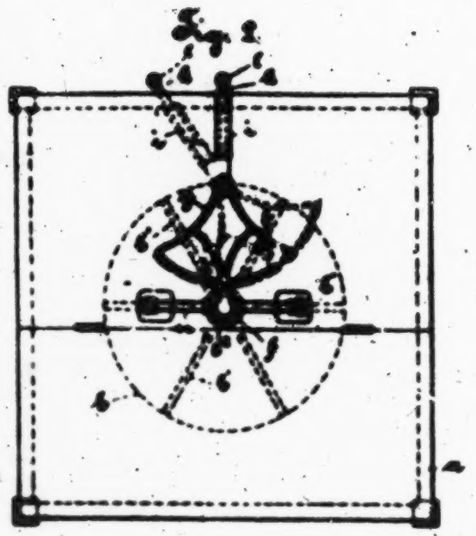


Fig. 3

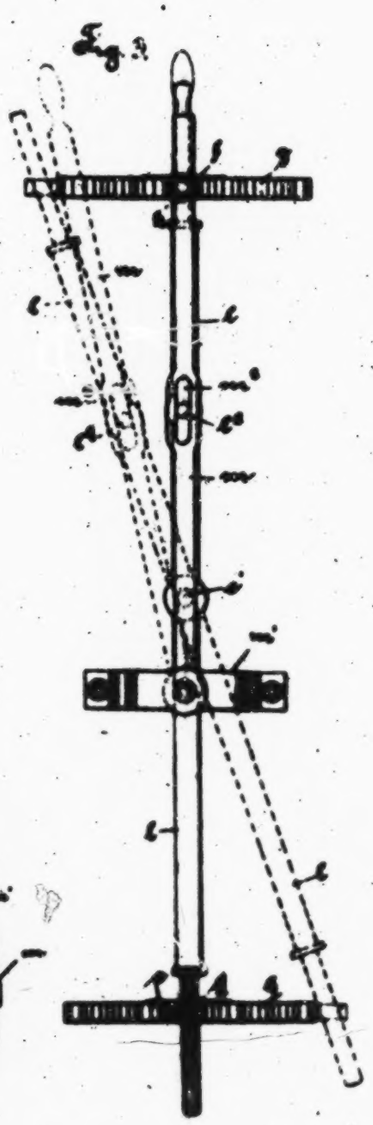
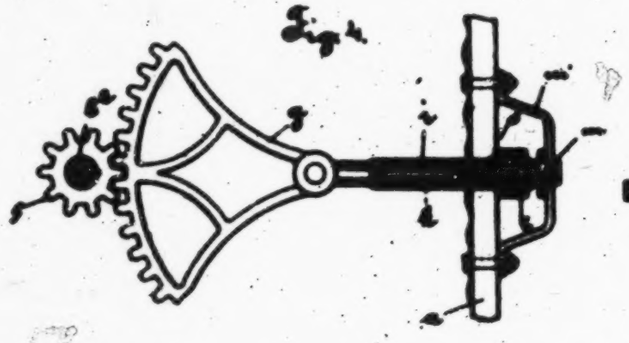


Fig. 4



1930

Sept. 27, 1927. Re. 16,746

A. R. HAAG

WASHING MACHINE

Original Filed July 25, 1924

Fig. 6.

Fig. 5.

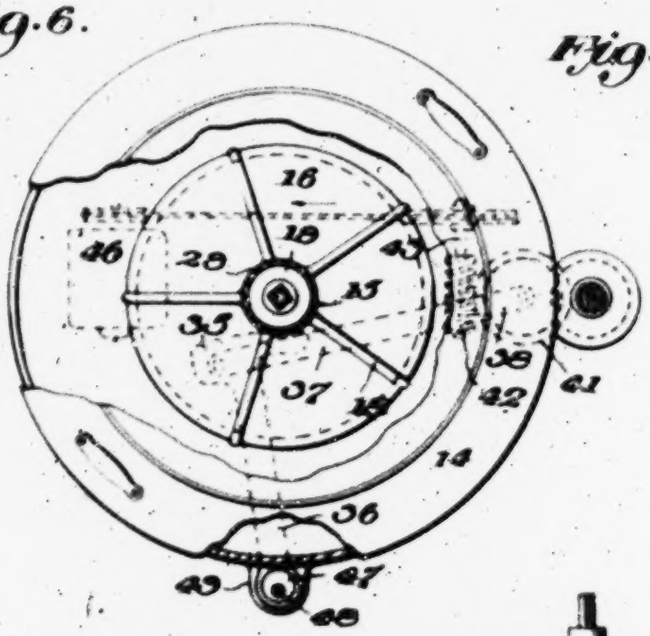


Fig. 1.

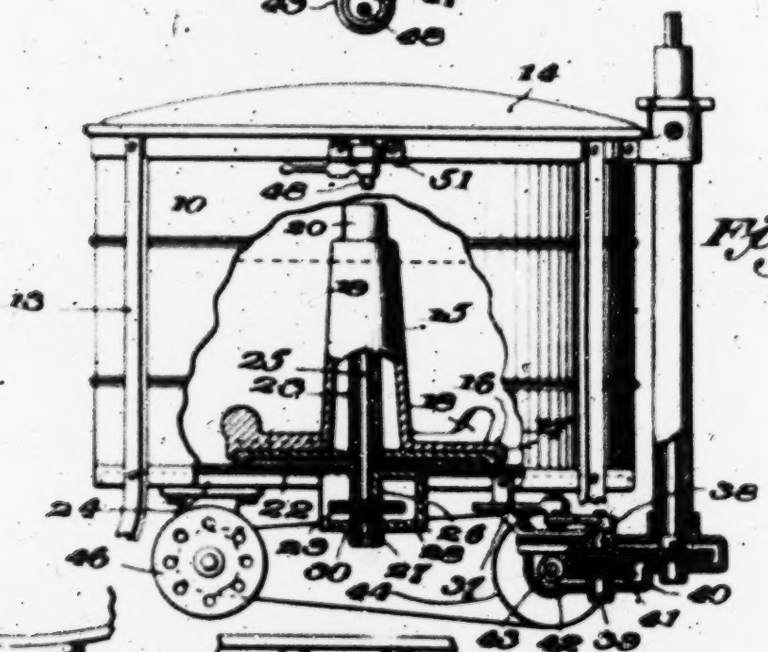


Fig. 2.

Fig. 3.

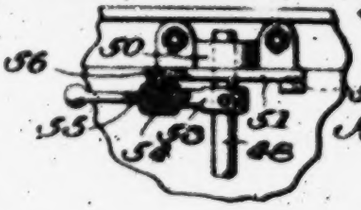


Fig. 4.

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Attorneys

Reissued Sept. 27, 1927. Re. 16,746

UNITED STATES PATENT OFFICE.

ALBERT R. HAAG, OF PEORIA, ILLINOIS.

WASHING MACHINE.

Original No. 1,563,624, dated December 1, 1925, Serial No. 728,079, filed July 25, 1924. Application for reissue filed February 19, 1927. Serial No. 169,629.

My invention relates to washing machines.

The invention has special reference to agitating means, driving mechanism therefor, and to details of structure and combination of parts whereby the improved result herein sought is obtained.

One object of my invention is to provide an improved agitator mounted adjacent to the bottom of the receptacle or tub and submerged within the liquid therein, and also the relationing of the agitator to a centering and guarding device at the bottom of the container whereby foreign matter such as dirt and the like is prevented from entering beneath the agitator.

The invention also contemplates providing the agitator member with a vertical upstanding sleeve disposed axially with respect to the center of the container and extending upwardly above the normal water line of the tub and expanded to such substantial proportions that it occupies a substantial portion of the central part of the container, whereby clothes will be prevented from collecting in the central portion of the container, and will be maintained within the zone of greatest agitation.

Another object of the invention is to provide a simple, inexpensive, and efficient means for driving the agitator. More particularly it is intended to drive the agitator from a point above the normal water line of the receptacle from a driven shaft projecting upwardly through a central opening provided in the bottom of the tub, means being provided to effectively prevent leakage through the opening through which the driving member enters the receptacle.

The invention also includes improved details of construction in the agitator driving means, and special means for making or breaking driving connection with the agitator member, and means for locking the driving means either into or out of operating connection with the agitator.

The invention also includes provision of a special journal in association with the driving means for the agitator to minimize requirement of lubrication.

Referring to the drawings:

Fig. 1 is a plan view of the machine with the lid portion broken away and disclosing in dotted lines the arrangement of operating gear parts and driving means below the bottom of the container or tub, parts of the view being in section to show operating means for effecting connection or disengagement of driving connection for the agitator member.

Fig. 2 is a side elevation showing the container and parts connected therewith, said container being broken away to show the interior operating parts, the latter being partially in section.

Fig. 3 is a detailed plan view showing an operating means for effecting engagement or disengagement of the gear parts.

Fig. 4 is a side elevation showing the same subject matter as disclosed in Fig. 3, a portion of said figure being broken away to show detailed parts.

Fig. 5 is a vertical sectional view of the upper end of the sleeve member provided on the agitator, and illustrates the manner of establishing a driving connection for the agitator.

Fig. 6 is a sectional view on the line 5—5 of Fig. 5.

Referring more particularly to the drawings, the reference character 10 refers generally to a circular container or tub, 13 to leg supports for the container, and 14 to a removable lid or cover.

Reference character 15 denotes generally the agitator member herein illustrated as being constructed as a single unit. The agitator consists of a circular disk or base member 16 provided with a depending peripheral flange 17. The upper surface of the disk is provided with agitating blades 18 which are either integral with or suitably attached to the disk, there being preferably four of such blades arranged relatively in substantially equally spaced relation.

The numeral 19 refers to an upstanding sleeve of substantial diameter extending upwardly to a point above the normal water line of the container, the upper portion of said sleeve being restricted as at 20 and provided with an interior bore 21ª, the latter being slightly tapered as shown in Fig. 5 to provide a seat for a driving member hereinafter referred to.

A circular member 22 is fixed in the central portion of the bottom of the container, and is relatively proportioned to the agitator disk or base so that when the agitator is in operative position, the peripheral flange 17 of the agitator will overlie the edges of the member 22, and in such fitted relation

that relative reciprocation will be effected, at the same time being so snugly fitted that foreign matter will not be permitted to enter therebetween.

It will also be appreciated that the member 22 will serve to center the agitator and prevent undesirable lateral movement or wobbling which might otherwise have a tendency to take place, owing to the distance at which the agitator is supported above the point where the greatest thrust occurs. While the objectionable wobbling movement of the agitator is effectively prevented by the member 22, it will be apparent that such result can be accomplished by various other arrangements provided for that particular purpose, and the applicant does not wish to be limited to the specifice centering means disclosed.

To safeguard against leakage through the entry into the container of driving means for the agitator member, a column or sleeve 23 is provided, the same having such close threaded connection with the circular member 22 as to prevent leakage, said sleeve extending upward to a point above the normal water line of the container, its upper end serving as a seat for a special journal hereinafter referred to, and constituting the main support for the agitator member.

24 is a ring member attached at the bottom portion of the container and serves as a support for gear housings and various operating mechanisms including a motor and gear parts, however, as such supports and gear housings from no part of the present invention, no detailed disclosure or special reference is made thereto.

Referring now particularly to operating means for the agitator, 25 is a vertical shaft having journaled bearing in sleeve member 26, depending from ring member 24, and also in sleeve member 27, depending from gear casing member 28, forming a part of and depending from ring member 24, there being fixed to said shaft, gear wheel 29, provided with a hub portion 30, said hub and gear being dimensioned with respect to sleeve member 26 and the bottom of housing 28 to permit it to be reciprocated. The upper end of shaft 25 (see Fig. 5) is mutilated to form a flat face thereon, and to it is attached a clutch member 31, having a central opening fashioned in conformity to the upper end of shaft 25, and is secured thereto by means of pin 32, said clutch member being fashioned with angular outer faces to adapt it for entry and co-operation with the similar tapered angular opening 21ª in the extension portion 20 of the sleeve member 19. The clutch member is also provided with an annular flange 33 at its lower end adapted to engage offset portions at the lower extremity of extension 20, thereby forming a stop to facilitate proper relationing of said clutch to its seat within extension 20. In practice, agitator member 15, comprising the disk and sleeve members is so proportioned with respect to member 22ª and clutch member 31, that when said agitator is placed in proper working position upon its support, it will be supported at its upper end by the sleeve 23 and the interposed bearings.

It will be noted that the unitary agitator structure 15, comprising the disk and sleeve member, may be readily removed from its seat and driving connection by simple vertical lift, without the requirement for release of parts or mechanisms.

A special journal bearing is provided for the upper end of shaft 25, to meet the circumstances of its being located in a position where ordinary oiling is not feasible, due to the danger of leakage to the container. The bearing is indicated at 34, and is formed from a porous substance, as wood, to facilitate its being saturated with oil. A bearing of ready oil absorbing quality, either of wood or other serviceable material, having been saturated with oil and sleeved within the upper end of tubular member 23, forms a bearing that requires infrequent re-saturation and is so related to the mechanism that it may be readily removed for saturation or to facilitate substitution of another similar journal.

With reference to the driving connection for reciprocating the agitator, 35 is a gear segment swingably in connection with swinging arm 36, the latter being longitudinally adjustably pivoted in conjunction with a cam member, hereinafter referred to. Gear segment 35 is caused to be reciprocated through a definite distance through and by means of a bar member 37, driven from a crank arm 38, fixed to driven shaft 39, said shaft being suitably supported in connection with gear housing 40, the latter being suitably connected with a general framing. Shaft 39, is driven through worm wheel 41, fixed thereon, the latter being driven from worm 42, on shaft 43, said shaft 43, being driven from belt wheel 44, which said belt wheel is in turn driven from a wheel and belt connection with motor 46.

A driving connection is shown to a wringer operating shaft, however, as this feature is not included in the present invention, said driving connection for the wringer is not herein specially referred to.

In the operation of the agitating member within the container, it is necessary that means be provided for effecting disconnection with the driving means for such agitating means without stopping the motor and to that end I have provided the cam member 47, co-operatively seated in connection with swinging arm 36, to which segment gear 35, is attached, whereby upon the turning of said eccentric member within its

seat in arm member 36, the latter will be caused to be retracted or extended to effect optional engagement or disengagement of segment gear 35, with gear member 29, on agitator shaft 25, thereby provided for engagement or disengagement of the driving connection to the agitator. The particular means for operating cam member 47 include vertical shaft 48 (to which said cam is fixed), journaled in bracket member 49, at the bottom portion of the container and its upper end journaled in boxing member 50, said boxing member being provided with an outwardly extending flange 51, provided with locking seats 52 on the underface thereof. A rocker arm 53 is fixed to shaft 48, within which spring 55 is carried. 56 is a ball so disposed with respect to spring 55 and the lower face of flange 51 that the same will be permanently held between said spring and flange members, and, as the rocker arm 53 is turned, the ball may be caused to register optionally with either of the seats 52, thereby affording locking means to hold the gear segment 35 either into or out of engagement with gear member 29.

What I claim is:

1. In a washing machine, in combination, a clothes container, an agitator therein, a member extending upwardly from the agitator member to a point above the normal water level therein fashioned at its upper end to provide a driving connection for agitator operating means, a driving member for said agitator extending upwardly through the bottom of the container and fashioned at its upper end for detachable driving connection with the extension from the agitator member, means for reciprocating the agitator driving member, and a guard interposed between the agitator and the bottom of the tub and spaced from the side walls of the tub to prevent the entrance of extraneous matter beneath the agitator.

2. In a washing machine, in combination, a tub or container, an agitator member, a member extending upwardly therefrom fashioned at its upper end to provide a driving connection, for a driven member, a suitably supported driven member extending upwardly through the bottom of the container and through the extension member of the agitator fashioned at its upper end for driving engagement with said agitator extension, a guard element interposed between the agitator member and the bottom of the tub, and means for reciprocally driving said driven member, a sleeve member projecting upwardly from the guard element to a point above the normal water line and surrounding the driven member.

3. A washing machine, in combination, a container, an agitator member, means interposed between the agitator and the bottom of the container for centering said agitator member and excluding extraneous matter from entering between said member and the bottom of the tub, a circular sleeve member of substantial diameter extending upwardly from the agitator to a point above the normal water line fashioned for driving connection with a drive shaft, a suitably supported driving shaft extending upwardly through the bottom of the container to a point to accommodate driving connection with the upper end of the sleeve member, means for reciprocating the drive shaft and an inner sleeve member connected with the bottom portion of the container and extending upwardly therefrom to a point above the normal water line and serving as a housing for the drive shaft.

4. In a washing machine in combination, a container, a circular member disposed about the axial center of the container and extending upwardly from the bottom thereof, a disk member similarly circularly fashioned and having a downwardly extending peripheral flange adapted to overlie the circular member, a sleeve member extending upwardly from said disk to a point above its normal water line and disposed about a line through the axial center of the disk and fashioned at its upper end in a manner to effect driving connection with a drive shaft a plurality of agitator blades disposed radially on said disk, a suitably supported drive shaft extending upwardly through the bottom of the container to a point above the normal water line therein, fashioned at its upper end for driving connection with the sleeve member, means for reciprocating the drive shaft to effect reciprocation of the sleeve and associated disk, a water seal including a tubular member housing said drive shaft connected with the circular member at the bottom of the container and extending upwardly to a point above the normal water line within the container, and a bearing for the upper end of the drive shaft supported in connection with the sleeve member of the seal.

5. A washing machine having in combination a container, an agitator within said container, a member interposed between said agitator and the bottom of the container, the said member being adapted to prevent the entrance of extraneous matter beneath the agitator, and means for reciprocating the agitator.

6. In a washing machine, in combination, a container, an agitator disk, a member beneath said disk to prevent the entrance of foreign matter between the disk and the bottom of the container, a sleeve member connected with and extending upwardly from the disk to a point above the normal water line of the container, agitator members on the agitator disk, a drive shaft ex-

tending upwardly within the container for engagement with the sleeve member to reciprocate the same in conjunction with said agitator disk, means for reciprocating said shaft to effect reciprocal activity of the agitator disk, and a water seal housing said shaft and connected with the shaft entry way to the container and extending upwardly to a point above the normal water line of the container.

7. A washing machine having in combination, a container, an agitator disk within said container, a stationary disk interposed between the agitator and the bottom of the container forming a substantially watertight connection between the agitator and the bottom of the container, a sleeve member connected with the central portion of the agitator disk and extending upwardly to a point above the normal water line of the container, a drive shaft for said agitator having a driving connection with the sleeve member at a point above the normal water line, a tubular member connected to said stationary disk and interposed between said drive shaft and the sleeve member, and means for reciprocating said shaft.

8. A washing machine having in combination a container, an agitator within said container, and a member at the central portion of the bottom of the container, said member being adapted to prevent the entrance of foreign matter beneath the agitator and to center the agitator, and means for reciprocating the agitator.

9. A washing machine having in combination a container, an agitator within said container and a baffle member at the central portion of the bottom of the container directly inter-related with the agitator and the bottom of the container to prevent the lateral movement of the agitator, and means for reciprocating the agitator.

10. A washing machine having in combination a tub, a driving member projecting through the bottom of the tub to a point above the normal water line thereof, an agitator adjacent the bottom of the tub, means for supporting the agitator from the upper extremity of the driving member, and means directly associated with the agitator and the bottom of the tub to prevent lateral movement of the agitator.

11. A washing machine having in combination a container, an agitator within the container and adjacent the bottom thereof, means for reciprocating the agitator and means interposed between said agitator and the bottom of the container to center the agitator and prevent lateral movement thereof.

12. A washing machine having in combination, a tub, a driven member extending upwardly therein to a point above the normal water line, an agitator actuated by said driven member and detachable therefrom by a vertical lift, said agitator comprising a main laterally extending body portion disposed adjacent the bottom of the tub, and a sleeve member extending upwardly from the main body portion to a point above the normal water line of the tub, the upper end of said sleeve being driven and centered by said driving member and a member engaging said laterally extending body portion for centering the lower portion of the agitator against lateral movement.

13. A washing machine having in combination a tub, provided with a central opening in the bottom thereof, a tubular member within the tub in axial alignment with said opening, the said tubular member projecting upwardly to a point above the normal water line of said tub, a driving member projecting through the opening in the bottom of the tub and the tubular member to a point beyond the upper end of said member, an agitator located adjacent the bottom of the tub, a sleeve member connected to the agitator and spaced from the tubular member, means for connecting the upper end of the sleeve member to the upper end of the driving member, and guarding and centering means directly associated with the said agitator adapted to prevent lateral movement of the agitator and exclude the entrance of foreign matter thereunder.

14. In a washing machine, a tub having an opening centrally disposed in the bottom thereof, a vertical drive shaft projecting through said opening to a point above the normal water level in the tub and adjacent to the top thereof, a column surrounding said shaft and terminating adjacent the upper end thereof, said column having a watertight connection at the bottom of the tub, means for agitating the contents of the tub, said agitating means comprising a disklike member arranged adjacent to the bottom of the tub, a plurality of agitating blades on the upper surface of said disk member, a central sleeve formed integral with said disk and projecting upwardly therefrom, means for positively connecting the upper end of said sleeve with the upper end of the drive shaft whereby the agitating means is driven from said shaft, and means for centering the said disk member about its vertical axis during actuation.

15. In a washing machine, a tub having an opening centrally disposed in the bottom thereof, a vertical drive shaft, projecting through said opening to a point above the normal water level in the tub and adjacent to the top thereof, a column surrounding said shaft and terminating adjacent the upper end thereof, the said column having a watertight connection at the bottom of the tub, means for agitating the contents of the tub, the said agitating means comprising a disklike member arranged adjacent

to the bottom of the tub, a plurality of agitating blades on the upper surface of said disk member, a central sleeve formed integral with said disk and projecting upwardly therefrom a substantial distance, means for positively connecting the upper end of said sleeve with the upper end of the drive shaft whereby the agitator is driven from said shaft, and a bearing member for centering the lower end of said disk member during actuation.

16. In a washing machine, a tub having an opening centrally disposed in the bottom thereof, a vertical drive shaft projecting through said opening to a point above the normal water level in the tub and adjacent to the top thereof, a column surrounding said shaft and terminating below the upper end thereof, said column having a watertight connection at the bottom of the tub, means for agitating the contents of the tub, said means comprising a disklike member arranged adjacent to the bottom of the tub, a central sleeve formed integral with said disklike member and projecting upwardly therefrom, the said sleeve being constructed to fit over the upper end of the drive shaft and engage the upper end of the column whereby the agitating means is supported by the column, means for positively connecting the upper end of the sleeve to the drive shaft whereby the agitating means is driven from said shaft, the said connecting means permitting the removal of the agitating means by simple vertical lift, and a bearing member for centering the lower end of said disk member during actuation.

17. In a washing machine, a tub, having an opening centrally disposed in the bottom thereof, a vertical drive shaft projecting through said opening to a point above the normal water level in the tub and adjacent to the top thereof, means for sealing said opening, and means for agitating the contents of the tub, said agitating means comprising a disklike member arranged adjacent to the bottom of the tub and having the periphery thereof spaced a substantial distance from the wall of the tub, a central sleeve projecting upwardly from said disk to a point adjacent the upper end of the drive shaft, means for positively connecting the upper end of said sleeve with the drive shaft whereby the agitating means is driven from said shaft.

18. In a washing machine, a tub having an opening centrally disposed in the bottom thereof, a vertical drive shaft projecting through said opening to a point above the normal water level in the tub and adjacent to the top thereof, housing and sealing means surrounding said shaft, and means for agitating the contents of the tub, said agitating means comprising a disklike member arranged adjacent to the bottom of the tub and being substantially smaller in diameter than the bottom of the latter, a central sleeve projecting upwardly from said disk to a point adjacent the upper end of the drive shaft, means for positively connecting the upper end of said sleeve with the drive shaft whereby the agitating means is driven from said shaft; and means for centering the agitator about its vertical axis.

In testimony whereof, I have hereunto affixed my signature.

ALBERT R. HAAG.

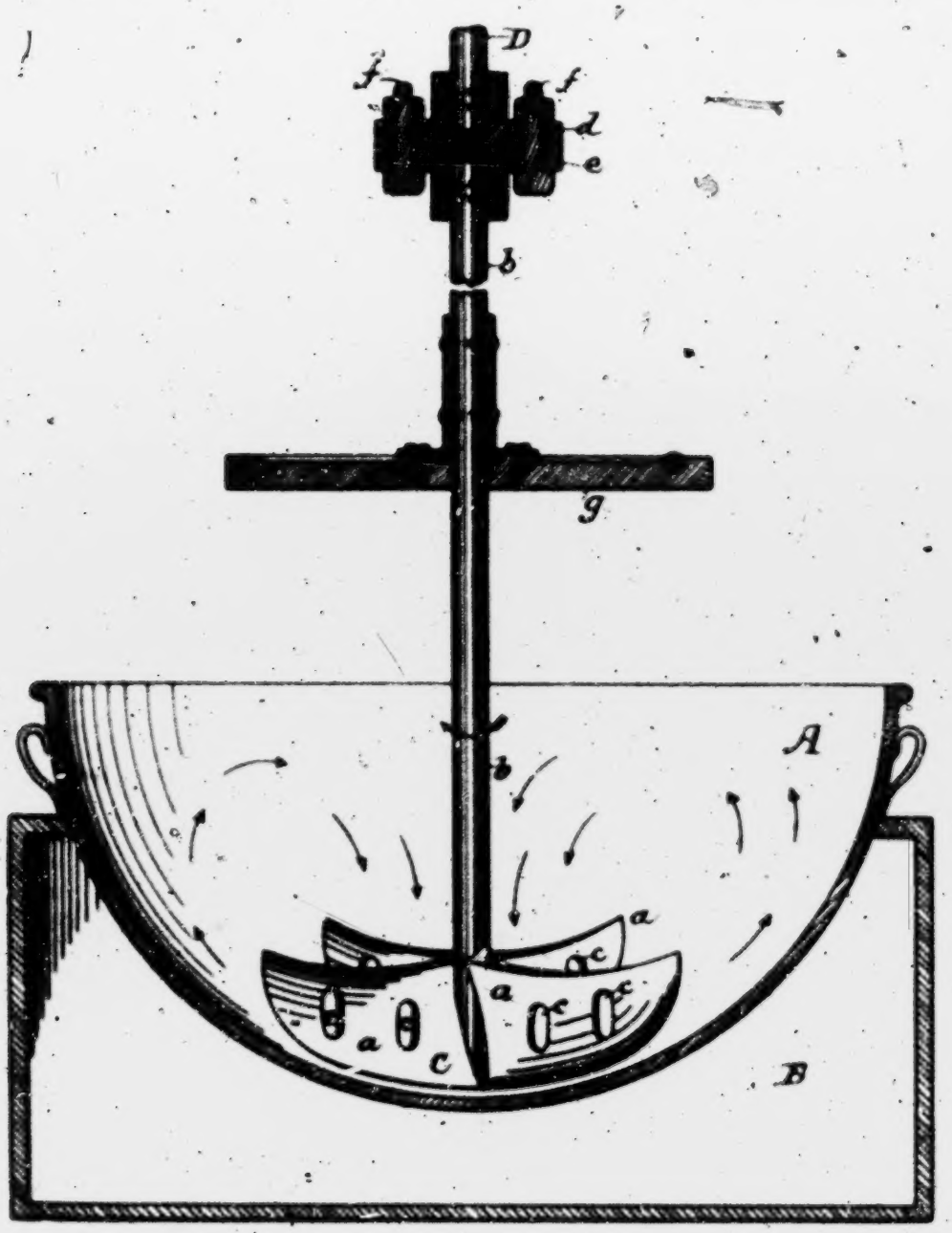
995

(No Model.)

C. MARCHAND.

MANUFACTURE OF HYDROGEN PEROXIDE.

No. 273,569. Patented Mar. 6, 1883.



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UNITED STATES PATENT OFFICE.

CHARLES MARCHAND, OF NEW YORK, N. Y.

MANUFACTURE OF HYDROGEN PEROXIDE.

SPECIFICATION forming part of Letters Patent No. 273,569, dated March 6, 1883.

Application filed August 2, 1882. (No model.)

To all whom it may concern:

Be it known that I, CHARLES MARCHAND, of New York city, in the county and State of New York, have invented a new and useful improvement in the Manufacture of Hydrogen Peroxide, which improvement is fully set forth in the following specification.

This invention has reference to the manufacture of hydrogen peroxide or oxygenated water by addition of barium or calcium binoxide to an acid, (sulphuric, nitric, acetic, oxalic, hydrochloric, hydrofluoric, hydrofluosilic, and the like,) the binoxide having been mixed with water.

Heretofore hydrogen peroxide has been made by adding the barium or calcium binoxide, mixed with water, to the diluted acid, the binoxide being added from time to time in small quantities, the vessel in which the operation is conducted being set in a refrigerating medium, and the liquid being agitated or stirred to facilitate the reaction. The stirring has been performed by hand.

The present invention is based on the fact or discovery that the reduction of the barium or calcium binoxide takes place under conditions much more favorable in point of rapidity and yield when the acid to be neutralized is given a movement of rotation both vertically and horizontally by a screw or other suitable means, which at the same time creates both constant and ever-changing eddies, the said movement of rotation being imparted continuously during the addition of the binoxide.

The present invention consists, therefore, first, in imparting to the acid a movement of rotation, the time required for the chemical reaction being thereby lessened, while the reaction itself is more complete.

The apparatus shown in the accompanying drawing is preferably employed, and forms also part of the invention. A view in vertical section and elevation is given.

A is the receptacle for the acid; B, a jacketing-vessel for containing the refrigerant or cooling medium; C, the screw, and D a vertical power-shaft. The acid-receptacle need not be of any particular size, but a good capacity is from five hundred to one thousand gallons. It is preferably hemispherical, but may be cylindrical, frusto-conical, or other suitable form; and it is made of or lined with material adapted to resist the action of the acid. For use with hydrofluoric acid, a sheet-iron or, better, a copper vessel lined with lead may be used, or one of platinum, gold, or silver, or one otherwise rendered non-corrodible. The screw C is provided with helicoidal blades *a*, ordinarily two, three, or four in number, set obliquely on the arbor or screw-shaft *b*. The blades are preferably pierced with holes *c*. The screw is suspended in the receptacle A, being detachably connected with the lower end of the power-shaft D by the pieces *d e*—one fixed to the power-shaft and the other to the screw-shaft, and clamped together by the bolts *f*. On the screw-shaft, above the top of the receptacle A, is fixed a disk, *g*, of wood or other suitable material, which catches the oil from the bearings of the power-shaft, and other foreign matters that otherwise would be liable to fall into the receptacle. The power-shaft is suspended in its bearings by suitable collars, which enable it to support the screw C, and is driven from a horizontal shaft through beveled gearing, or by other well-known or suitable mechanical means. The length of the screw-shaft is such that the blades of the screw do not in operation touch or scrape the interior of the receptacle A. The jacketing-vessel B is of ordinary or suitable construction. The cooling medium commonly employed therein may be placed in it.

The vessel B being filled with the cooling medium, the proper quantities of acid and water (say twenty parts, by weight, of acid to one hundred parts of water, or other suitable proportions) are placed in the receptacle A. The screw C is put in motion, and the binoxide of barium or calcium, in the state of a more or less thick emulsion or milk, is added in small quantities. The revolving screw imparts a movement of rotation more or less rapid to the liquid, producing eddies therein and constantly changing the material, and the chemical reaction takes place very regularly and completely. Sufficient binoxide is added to secure the complete neutralization of the acid without rendering the hydrogen peroxide too alkaline. After a certain time, which varies with the quantity of the article manufactured and the amount of binoxide employed,

and during which the screw may be stopped, but is preferably kept in revolution, the production of the hydrogen peroxide is finished. It only remains to allow the matters in suspension to settle and to decant the clear liquor.

If it is desired to obtain the hydrogen peroxide in a state of greater purity than results from the above, the clear liquor is subjected to special chemical treatment, which, as it constitutes no part of the present invention, need not be described.

I claim the new improvements herein described, all and several, to wit:

1. The method of making hydrogen peroxide by cooling the acid solution, imparting thereto a continuous movement of rotation, as well in vertical as in horizontal planes—such, for example, as imparted by a revolving screw in a receptacle—and adding to said acid solution the binoxide in small quantities while maintaining the low temperature and the rotary or eddying movements, substantially as described.

2. The combination of the receptacle, the screw suspended therein so as not to touch the bottom, and the protecting or covering disk carried by the screw-shaft, substantially as described.

3. The combination of the receptacle, the power-shaft, the screw, and the means for detachably connecting the said screw with said power-shaft and for suspending it therefrom in said receptacle, substantially as described.

4. The apparatus described, comprising in combination the receptacle for the acid, the jacketing-vessel, the power-shaft, the suspended screw, and the means for preventing foreign matter from falling into the receptacle, substantially as set forth.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

CH. MARCHAND.

Witnesses:
R. S. HAYWARD,
G. H. PEARSALL.

(No Model.) 2 Sheets—Sheet 1

D. K. WRIGHT.

WASHING MACHINE.

No. 456,370. Patented July 21, 1891.

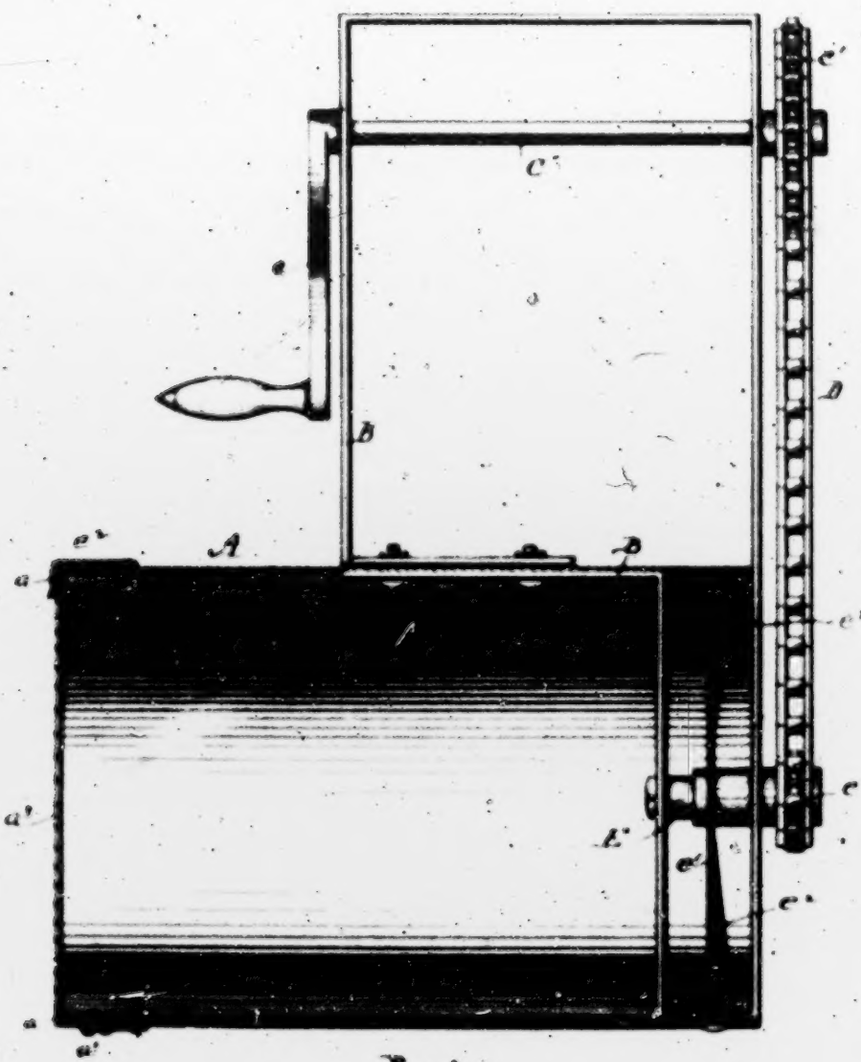

Fig. 1.

Witnesses:
A. Lightbourne.
R. F. Hendricks

Inventor
Daniel K. Wright
by Key & Co
Attys

(No Model.) 2 Sheets—Sheet 2.

D. K. WRIGHT.

WASHING MACHINE.

No. 456,370. Patented July 21, 1891.

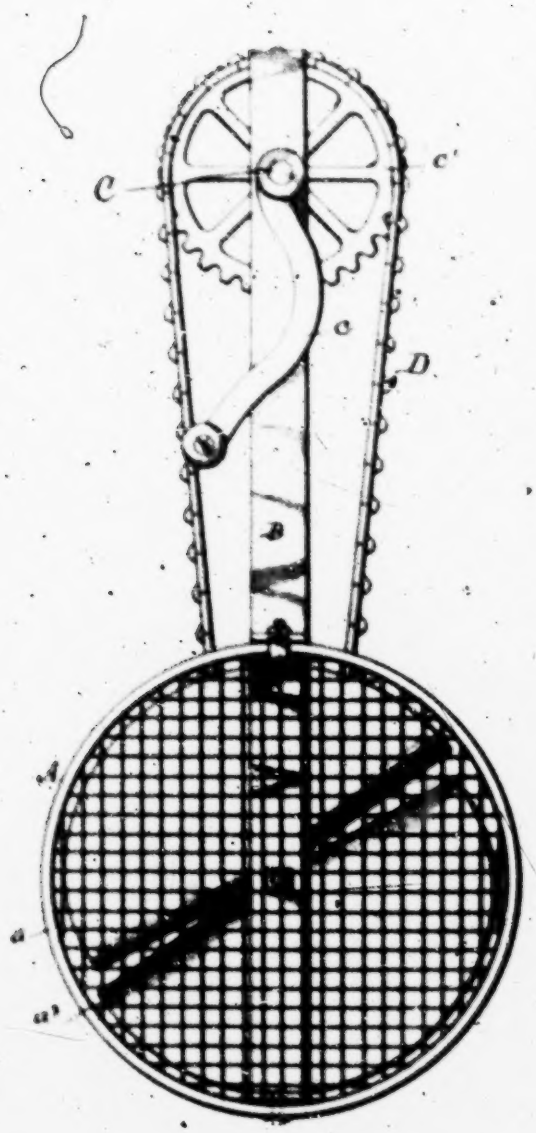

Fig. 2.

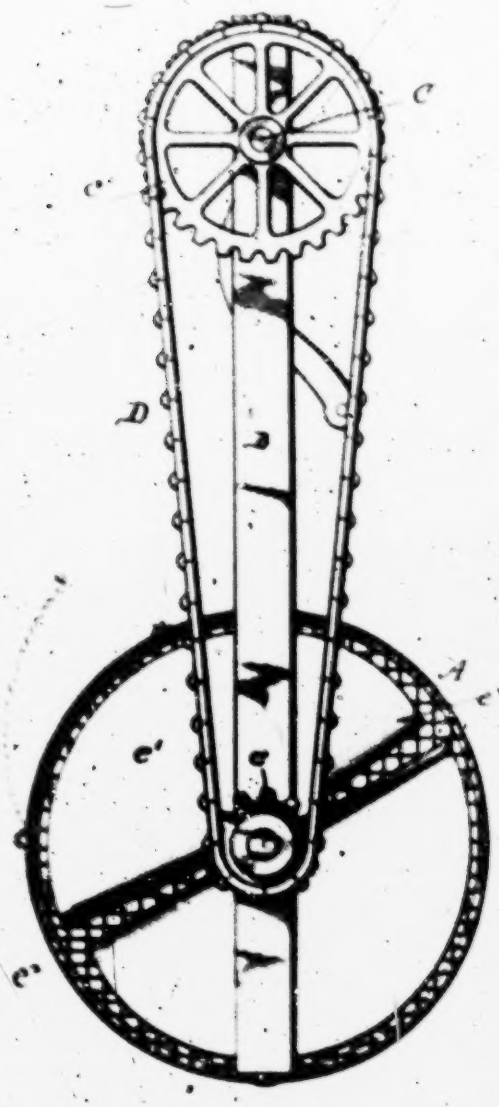

Fig. 3.

Witnesses:
W. Cushman
H. C. Dunham

Inventor:
David K. Wright
by O'Brien Cadwell
Atty.

UNITED STATES PATENT OFFICE.

DANIEL K. WRIGHT, OF AFTON, IOWA.

WASHING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 456,370, dated July 21, 1891.

Application filed April 9, 1891. Serial No. 388,290. (No model.)

To all whom it may concern:

Be it known that I, DANIEL K. WRIGHT, a citizen of the United States, residing at Afton, in the county of Union and State of Iowa, have invented certain new and useful Improvements in Washing-Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention has for its object to provide a simple washing machine or apparatus for family or laundry use which will quickly and thoroughly cleanse soiled clothes without subjecting them to attrition and consequent wear.

To this end my machine comprises a receptacle preferably cylindrical in form and provided at one end with a foraminous cover of wire-netting or similar material, said receptacle having at its opposite end a water-forcing wheel having inclined blades or wings and carried by a short shaft arranged within said receptacle and operated from a suitable driving-shaft, as will hereinafter be more fully explained.

In the drawings, Figure 1 is a sectional elevation of my improved machine, and Figs. 2 and 3 are opposite end views thereof.

A denotes a receptacle, preferably of cylindrical form and constructed of heavy sheet metal, said receptacle being preferably of a size suitable to be contained in an ordinary wash-boiler or wash-tub. To one end of said receptacle is attached an open-work or foraminous cover, which may be connected therewith simply by a hinge a' and hook a^2 or in any other suitable manner. Said cover, as herein shown, consists of a band a, in which is suitably secured a circular piece of wire-netting a^3.

B denotes a suitable frame extending above the receptacle A and consisting, as herein shown, of a single bent piece of wrought-iron doubled upon itself above and below, as clearly shown in Fig. 1. Journaled in the upper part of the frame B is a driving-shaft C, provided at one end with a crank c and at its opposite end with a sprocket-wheel c', the latter being connected by a chain D with a smaller sprocket-wheel e on a short shaft E, journaled in the lower part of said frame and carrying the water-forcing wheel e' within the receptacle or cylinder A, and provided with a suitable number of inclined blades or wings e^2. The proportional size of the sprocket-wheels c' and e is preferably such as to cause the shaft E to turn three or four times to one revolution of the driving-shaft C.

The operation of my invention is as follows: A quantity of soiled clothes to loosely fill the receptacle or cylinder A is placed therein, and the said cylinder is then immersed in water in an ordinary wash-boiler or wash-tub. The operator then steadies the machine with one hand and turns the crank with the other, such operation rapidly rotating the water-forcing wheel e' and causing the hot suds to be forced through the clothes to be cleansed and out through the foraminous or open-work cover, the suds or water returning or flowing around outside of the receptacle to again be forced through the clothes as long as the machine is in operation. As the receptacle is stationary or non-rotary, the clothes are not tumbled about, and are therefore not worn by attrition, but are thoroughly cleaned simply by the hot suds or water which is forced through them, as has been demonstrated by actual practice, so that the operation of washing causes no appreciable wear of the clothes, as is proved by the fact that the dirty suds are not filled with lint and shreds, as is usually the case. The passage of the water through the receptacle keeps the clothes away from the wheel e' and the lower shaft; but for safety any suitable screen may be provided for this purpose, if desired.

It will be apparent from the foregoing that I provide a washing-machine of compact form and simple construction which will thoroughly cleanse soiled clothes without wearing the same appreciably, which is portable and convenient for family use, but which may be enlarged for laundry purposes, if desired, the essential feature thereof being the stationary or non-rotary horizontal receptacle having in one end a winged water-forcing wheel and having a foraminous cover at the other, combined with means for driving said wheel. The open-work cover need not necessarily be removable, as a door, as denoted by dotted lines in Fig. 3, might be made in the side of the receptacle for the insertion or removal of the clothes.

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Having thus described my invention, I claim and desire to secure by Letters Patent—

1. A washing machine or apparatus consisting of a non-rotary horizontal receptacle adapted to be placed in a wash boiler, tub, or vat and provided at one end with an open-work cover and at its opposite end with a water-forcing wheel, combined with means for rotating said wheel.

2. A washing machine or apparatus consisting of the combination, with a non-rotary receptacle having an open-work cover at one end, of a frame attached to said receptacle, a driving-shaft journaled in said frame above said receptacle, a second shaft journaled within said receptacle at the end thereof opposite said cover and operatively connected with said driving-shaft, and a winged water-forcing wheel carried by said second shaft.

3. The combination, with the receptacle A, provided with the frame B and having an open-work cover at one end, of the shaft C, journaled in the upper part of said frame and having the crank c and sprocket-wheel c', the chain D, and the shaft E, journaled in the lower part of said frame within said receptacle and carrying the sprocket-wheel e and winged water-forcing wheel e'.

In testimony whereof I affix my signature in presence of two witnesses.

DANIEL K. WRIGHT.

Witnesses:
EWELL A. DICK,
HENRY CALVER.

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(No Model.)

P. J. RUSSELL & L. DE VAUX.

WASHING MACHINE.

No. 530,854. Patented Dec. 11, 1894.

Fig. 1

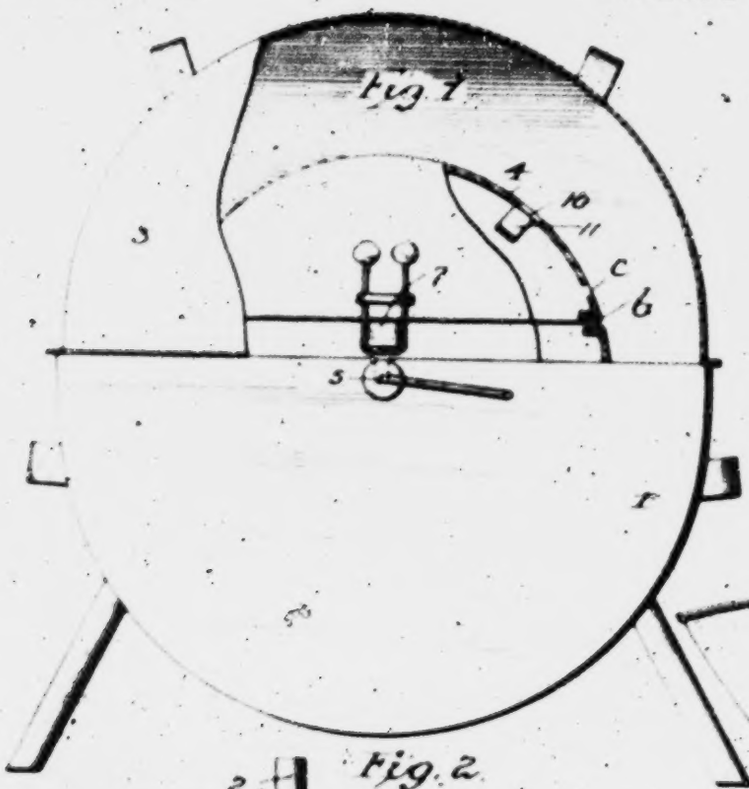


Fig. 3

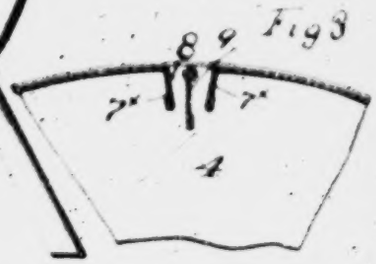


Fig. 2

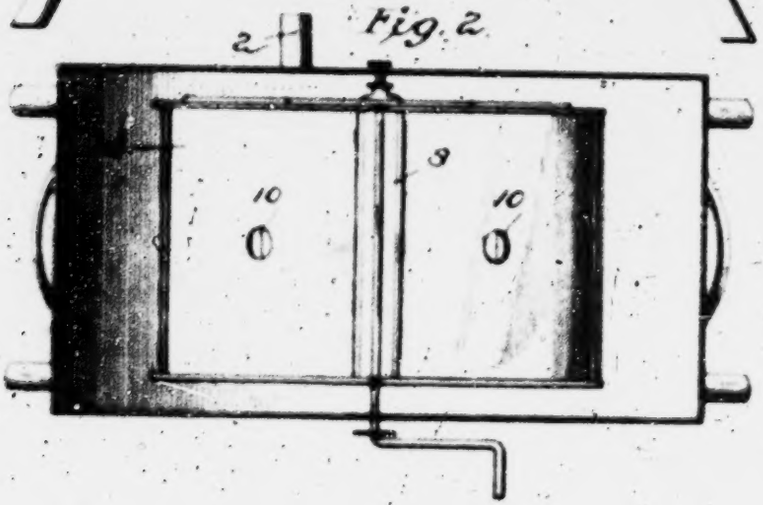


Fig. 4

Attest

Inventors

Russell & John Russell
Louis De Vaux.
by

UNITED STATES PATENT OFFICE.

PRESSLEY JOHN RUSSELL AND LOUIS DE VAUX, OF MARYVILLE, MISSOURI.

WASHING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 530,854, dated December 11, 1894.

Application filed August 1, 1894. Serial No. 519,208. (No model.)

To all whom it may concern:

Be it known that we, PRESSLEY JOHN RUSSELL and LOUIS DE VAUX, citizens of the United States of America, residing at Maryville, in the county of Nodaway and State of Missouri, have invented certain new and useful Improvements in Washing-Machines, of which the following is a specification.

Our invention relates to washing machines of that class in which an outer receptacle is provided for holding the water and an inner receptacle to contain the clothes to be washed, adapted to rotate inside the outer receptacle, the water being heated in a separate boiler and let into the outer receptacle through a pipe communicating with an opening therein by a hose.

The clothes are washed by the circulation of the water caused by rotating the inner receptacle, openings being provided for the admission of water in the periphery of said receptacle.

The object of the invention is to improve the general construction of the washing machine and to this end the invention consists of the details of construction as will be described hereinafter and particularly pointed out in the claim.

In the accompanying drawings—Figure 1, is a side elevation of the washing machine, parts of the outer receptacle being broken away. Fig. 2, is a plan view with the top of the outer receptacle removed. Figs. 3 and 4 are detail views of the clothes receptacle.

The outer receptacle 1 is provided with an inlet 2 for the entrance of water or steam. The receptacle is connected to a separate boiler, by a hose secured to the boiler and to said inlet. The receptacle 1 has a removable cover 3 that fits into the lower part, a flange around the cover resting on the upper edge of the lower part. Within the receptacle 1 is journaled the clothes receptacle 4, said clothes receptacle being secured to the shaft 5 that has bearing in the receptacle 1. These bearings are at the junction of the bottom of said receptacle and the cover. One end of the shaft 5 extends out beyond the side of the outer receptacle and is provided with a crank to rotate the receptacle 4. This receptacle is formed of two sections, one of which is smaller than the other, and serves as a cover, being hinged to the larger section at 6, a catch 7 holding the sections together.

Around the periphery of the smaller receptacle and extending entirely across the same are several openings 8 placed at regular intervals formed by bending the metal of the periphery inward thus making the small partitions 7^x. On each side of the periphery at the joint of the top and bottom sections, a small slot or opening *b* is left and just above this in the smaller section or top is a slot *c*. These correspond to the openings 8, except that they are without the partition 7.

Flaps 9 are hung in each of the openings 8, and these flaps are pivoted to each side of the receptacle. Between every two of the openings 8 in the periphery of said receptacle 4 are circular openings 10 that are provided with guards 11 secured to the inside of said receptacle, which serve to keep the clothes contained therein from blocking said opening, and allow the free ingress and egress of the water at all times.

In operation the clothes are placed within the receptacle 4 and the top shut down and fastened. The cover 3 is now shut down and the hot water or steam allowed to enter. The inner receptacle is then rotated by means of the crank mentioned and the water enters the openings in the periphery of said receptacle, being agitated meanwhile by the flaps 8. The hot water circulating through the clothes soon cleanses them of all dirt when they may be removed by lifting the top of the two receptacles without disturbing the relative position of either.

We claim—

In combination with the water receptacle, the clothes receptacle journaled therein having elongated openings in its periphery, flanges extending radially inward from the edges of said openings, and the flaps pivoted centrally of the openings and extending inward beyond the flanges, substantially as described.

In testimony whereof we affix our signatures in presence of two witnesses.

PRESSLEY JOHN RUSSELL.
LOUIS DE VAUX.

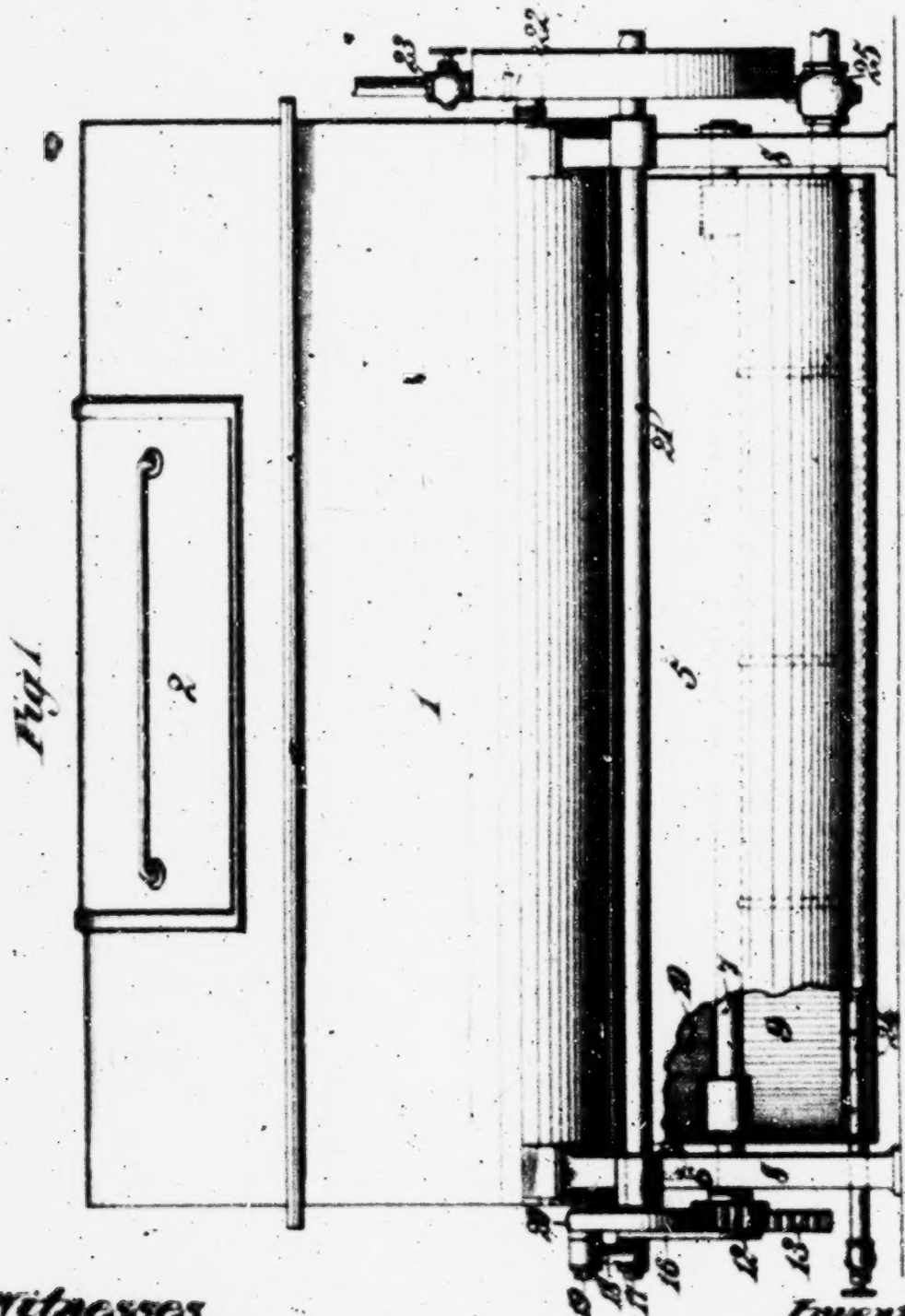
Witnesses:
W. H. RYER,
HENRY TOEL.

(No Model.) 2 Sheets—Sheet 1.

H. E. SMITH.

WASHING MACHINE.

No. 593,910 Patented Nov. 16, 1897.



Witnesses
Chas. Smith
Albert H. Norris.

Inventor
Hamilton E. Smith
By James L. Norris
Atty.

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(No Model.) 2 Sheets—Sheet 2.

H. E. SMITH.

WASHING MACHINE.

No. 593,910. Patented Nov. 16, 1897.

Fig. 3.

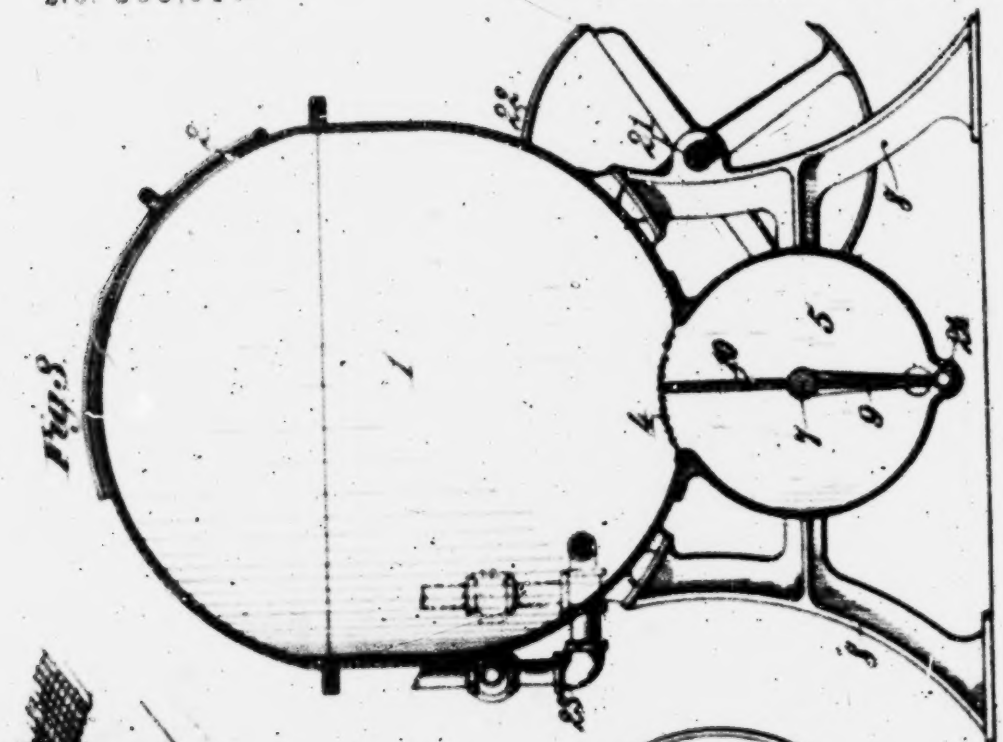
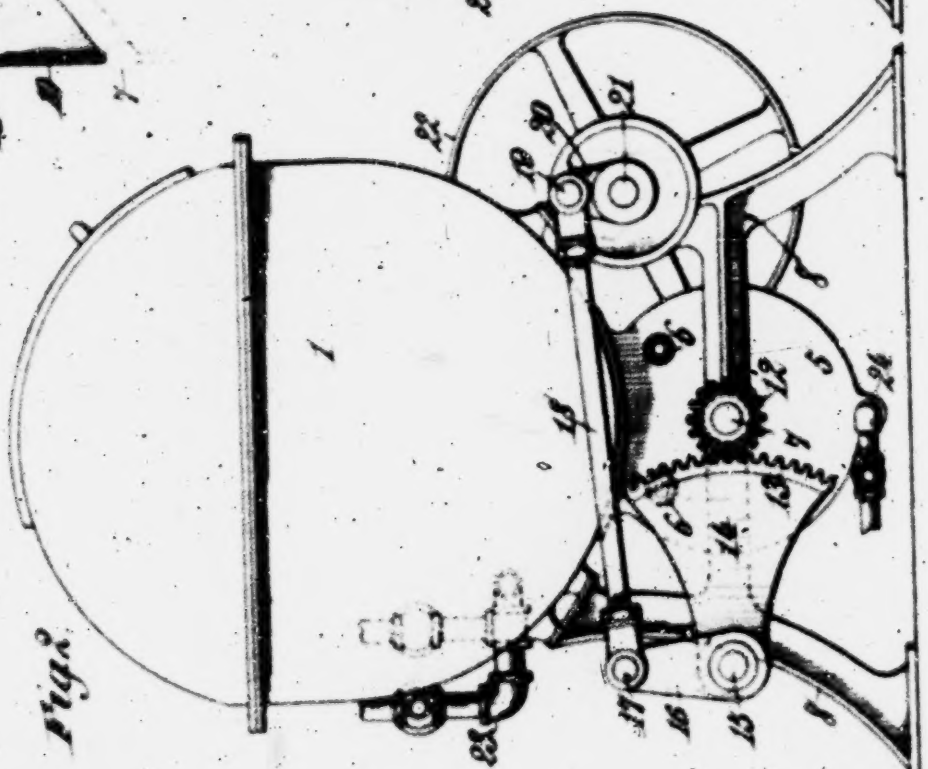


Fig. 4.

Fig. 2.



Witnesses
Abel Smith
Albert H. Norris

Inventor
Hamilton E. Smith
By James L. Norris
Atty.

UNITED STATES PATENT OFFICE.

HAMILTON E. SMITH, OF PHILADELPHIA, PENNSYLVANIA.

WASHING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 593,910, dated November 16, 1897.

Application filed January 26, 1897. Serial No. 620,823. (No model.)

To all whom it may concern:

Be it known that I, HAMILTON E. SMITH, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented new and useful Improvements in Washing-Machines, of which the following is a specification.

This invention relates to machines for washing clothes or other articles, particularly that class of power washing-machines designed for laundries where articles or clothes in large quantities require to be rapidly and thoroughly cleansed.

The chief object of my present invention is to provide a new and improved clothes washing machine wherein a steam-pump is dispensed with and a body of water is driven by simple mechanical means from a water-chamber through the clothes or articles contained in a holding vessel and is permitted to flow back or return to the water-chamber for a repetition of the operation, whereby a forced circulation of the water or washing liquid is obtained and the clothes or other articles are effectually and thoroughly cleansed. This object is accomplished in the manner and by the means hereinafter described and claimed, reference being made to the accompanying drawings, in which—

Figure 1 is a side elevation of a washing-machine embodying my invention. Fig. 2 is an end elevation of the same. Fig. 3 is a transverse sectional view taken vertically through the machine; and Fig. 4 is a detail sectional view of the dividing-plate and a portion of the wire screen which prevents the clothes passing from the clothes-holding vessel into the water-chamber, while permitting the water to freely pass from one to the other.

In order to enable those skilled in the art to make and use my invention, I will now describe the same in detail, referring to the drawings, wherein—

The numeral 1 indicates a vessel designed to contain or hold the clothes or articles which are to be cleansed. This vessel may be of any construction suitable for the purpose in hand, but as represented in the drawings it is in the form of a horizontal cylinder having closed ends and is provided in its upper portion with a door 2 of any desired construction which can be opened for the purpose of introducing or removing the clothes or other articles. This door is preferably constructed so that it will close water-tight, but as it may be of any suitable construction and be moved in any desired manner further explanation is deemed unnecessary.

The bottom portion of the clothes-holding vessel is constructed with a continuous longitudinal opening extending substantially the full length thereof and over which is arranged a wire or other suitable screen 4. A cylindrical or other suitably-shaped water-chamber 5 is suspended from the lower side of the clothes-holding vessel and is placed in communication therewith through the said continuous longitudinal opening provided in the bottom of the vessel. The water-chamber is represented as suspended from and supported by the cylindrical clothes-holding vessel; but I do not limit myself to this particular manner of supporting the water-chamber, as it may be otherwise sustained without altering the spirit of my invention.

The water-chamber as here shown is in the form of a cylinder having disk-shaped heads provided with air-induction valves of any known construction, such as ordinary check-valves, which will permit air to pass therethrough into the water-chamber during the operation of the machine, as will hereinafter appear. An oscillatory shaft 7, mounted at its ends in bearings on a suitable supporting-frame 8, extends horizontally through the center of the water-chamber and is constructed or provided with a radial water-propelling blade 9 of a length approximately coextensive with the length of the water-chamber between its disk heads. The water-propeller blade 9 may be a simple rectangular plate of metal, wood, or other suitable material, and its width is such that its outer edge lies quite near the inner circular surface of the water-chamber. The holding vessel 1 and the water-chamber 5 are designed to contain a body of water of greater or less volume, and the propeller-blade acts to drive the water from the water-chamber through the screen 4 into the clothes-holding vessel and through the clothes or articles therein contained, as will hereinafter appear. The upper portion of the water-chamber is pro-

vided with a longitudinal dividing partition or plate 10 of a length substantially coextensive with the length of the propeller-blade 9. The dividing partition or plate 10, as here represented, stands in a perpendicular position and fills the space between the wire screen 4 and the periphery of the horizontal shaft 7, as best seen in Fig. 4, in such manner that when the propeller-blade 9 moves in one direction the water in the water-chamber will be forced into the clothes-holding vessel at one side of the dividing partition or plate, and water from the vessel will pass from the latter into the water-chamber at the opposite side of the partition or plate, and when the propeller-blade moves in the opposite direction a reverse motion of the water takes place. The horizontal shaft 7 is designed to be oscillated for the purpose of oscillating the propeller-blade 9, and to secure this result by very simplified mechanism I provide one end of the shaft with a pinion 12, meshing into a segmental gear 13, forming a part of a segment 14. This segment is secured at one end to a rocker-shaft 15, mounted in suitable bearings on the frame 8, which supports the clothes-holding vessel 1. The rocker-shaft is provided with a rigidly-attached crank-arm 16, to which is pivoted, as at 17, one end of a connecting-rod 18. The other end of the connecting-rod is pivotally connected, as at 19, with a crank 20, secured to a main driving-shaft 21. This driving-shaft may be rotated in any suitable manner, but I prefer to provide it at one end with a driving-pulley 22, adapted to be belted to an engine or motor.

The clothes-holding vessel is provided with a hot and cold water connection 23, of any known construction, which will enable hot or cold water, either or both, to be introduced into the vessel wherever necessary.

The water-chamber 5 is provided in its lower portion with a longitudinal pocket in which is arranged a perforated steam-pipe 24 for introducing steam into the water-chamber to heat the contents thereof. This is a desirable and simple means of heating the water in the water-chamber; but I do not confine myself to this particular heating device, as the water-chamber may be otherwise heated without altering my invention.

The water-chamber is provided at one end with an outlet-valve 25 for discharging the water from time to time, as circumstances may require.

In the operation of my improved washing-machine the articles to be cleansed are placed in the clothes-holding vessel and a suitable quantity of water is admitted through the supply connection 23 until the water-chamber 5 is filled and the water rises to a greater or less level in the clothes-holding vessel. The water is maintained in a heated condition through the medium of the steam heating-pipe 24. The main driving shaft is then rotated by the driving-pulley 22, or otherwise, and the rotary motion of the crank 20 moves the connecting-rod 18 to and fro, thus rocking the crank-arm 16, rocker-shaft 15, and segment 14. As the segment is geared to the pinion 12, the rising-and-falling motion of the segment will turn the pinion first in one direction and then in the opposite direction, thereby oscillating the shaft 7 and the propeller-blade 9. The motions of the propeller-blade drive the water in the water-chamber 5 upwardly into the clothes-holding vessel through the articles therein, first at one side and then at the opposite side of the dividing partition or plate 10. The water from the chamber 5 can freely pass through the wire or other screen 4, but the latter sustains the clothes or articles in the holding vessel 1, so that they cannot pass therefrom into the water-chamber, which would be damaging to the clothes and interfere with the operation of the propeller-blade.

The central dividing partition or plate 10 effectually prevents the propeller-blade throwing the water from one side to the other side of the water-chamber and compels the water to rise upwardly into the clothes-holding vessel first at one side and then at the other side of the dividing partition or plate. As the water is forced upward at one side of the dividing partition or plate water from the clothes-holding vessel will descend at the opposite side of said partition or plate, so that a forced circulation of the water is maintained through the articles in the clothes-holding vessel, whereby they are effectually and thoroughly cleansed.

During the oscillating motion of the propeller-blade air is drawn into the water-chamber through the induction-valves 6. The admixture of air with the water is desirable and important in that it has been found to more effectually and rapidly cleanse clothes or other articles in the washing operation.

The invention is particularly useful in washing yarns, woolen materials, and sugar-sacks.

Having thus described my invention, what I claim is—

1. The combination with a clothes-holding vessel, of a water-chamber arranged beneath said vessel and communicating therewith, a screen which sustains the clothes in the holding vessel and prevents them from descending into the water-chamber, a dividing partition or plate arranged beneath the screen, an oscillating water-propelling blade working directly in the water-chamber and operating to drive the water upwardly at either side of said dividing partition or plate, and means for oscillating the water-propelling blade, substantially as described.

2. The combination with a clothes-holding vessel, of a water-chamber arranged beneath said vessel and communicating therewith, a screen for sustaining the clothes in the holding vessel, a rock-shaft extending through the central portion of the water-chamber and having an attached pendent water-pro-

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blade working in the water-chamber, a vertical partition extending longitudinally of the water-chamber between the said screen and the said rock-shaft, and mechanism, substantially as described, for rocking the shaft and oscillating the water-propelling blade, to raise the water alternately at opposite sides of said partition, substantially as described.

3. The combination of a clothes-holding vessel having a longitudinal opening in its bottom portion, a water-chamber arranged under said vessel and communicating therewith through said longitudinal opening, a screen which sustains the clothes in the vessel, a vertical partition running longitudinally through the top portion of the water-chamber, an oscillating water-propeller arranged below said partition and operating to drive the water from the water-chamber upward alternately at opposite sides of said partition, and pinion-and-gear mechanism for oscillating the water-propeller, substantially as described.

4. The combination of a clothes-holding vessel having a longitudinal opening in its bottom portion, a water-chamber arranged under said vessel and communicating therewith through said longitudinal opening, a screen which sustains the clothes in the vessel, a vertical partition running longitudinally through the top portion of the water-chamber, an oscillating water-propeller arranged below said partition and operating to drive the water from the water-chamber upward alternately at opposite sides of said partition, a pinion connected with the water-propeller, a toothed segment engaging the pinion, a rocker-shaft mounted in bearings on the machine-frame and to which the toothed segment is secured, a crank-arm extending from the rocker-shaft, a driving-shaft, and a rod connection between said crank-arm and said driving-shaft, for rocking the rocker-shaft to which the toothed segment is attached, substantially as described.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

HAMILTON E. SMITH.

Witnesses:
ALBERT H. NORRIS,
F. B. KEEFER.

W. C. FOSTER.

WASHING MACHINE.

APPLICATION FILED MAY 9, 1907.

907,766.

Patented Dec. 29, 1908.

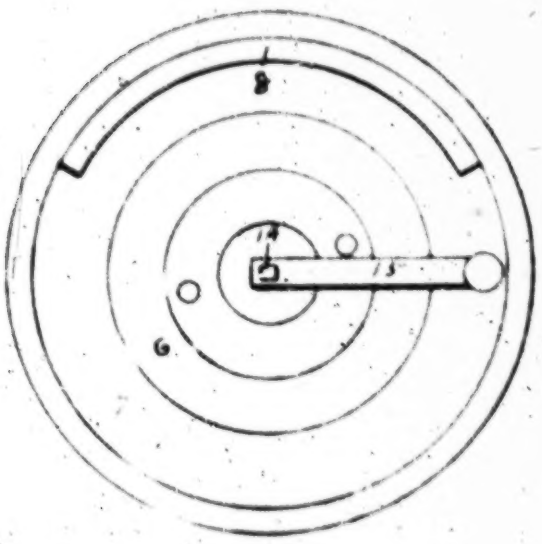

Fig. 1.

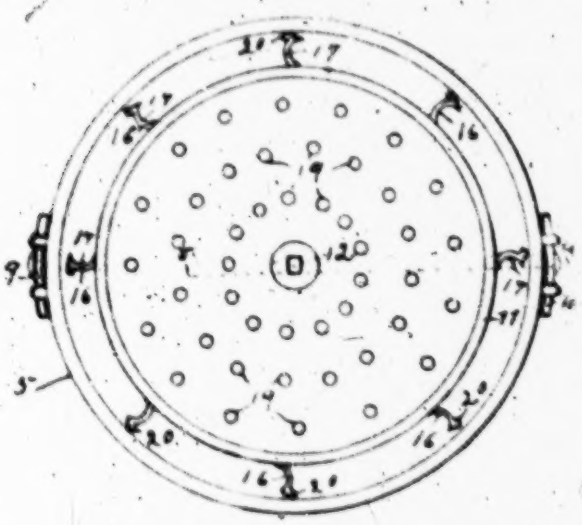

Fig. 2.

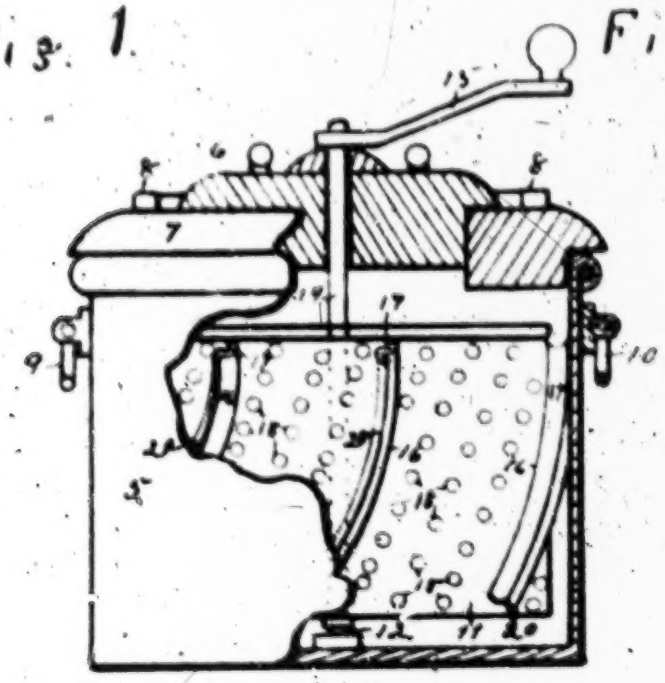

Fig. 3.

Fig. 4.

WITNESSES

Charles Ellmer.

R. S. West.

INVENTOR

Willard C. Foster,

BY

Lucius C. West

ATTORNEY.

1011

UNITED STATES PATENT OFFICE.

WILLARD C. FOSTER, OF KALAMAZOO, MICHIGAN.

WASHING-MACHINE.

No. 907,766. Specification of Letters Patent. Patented Dec. 29, 1908.

Application filed May 9, 1907. Serial No. 373,819.

To all whom it may concern:

Be it known that I, WILLARD C. FOSTER, a citizen of the United States, residing at the city of Kalamazoo, in the county of Kalamazoo, State of Michigan, have invented a new and useful Washing-Machine, of which the following is a specification.

My invention relates to forcing a portion of the wash water through the clothes, as a means of removing the dirt from the clothes, in lieu of scrubbing, or agitating.

The objects of my invention are the mechanical means herein described and claimed, to transfer portions of wash water which is in the machine, onto and through the garments, with ease, speed, force, and volume, and to continue said repetition of the operation of the water a few times until the clothes are clean. Please note this regarding my objects. Everything about my machine increasing the ease, speed, force, and volume of handling water in a given time, onto, and through the clothes, contributes to those objects.

In the accompanying drawing forming a part of this specification—Figure 1 is a plan of the washing machine as when being operated; Fig. 2 a plan of the machine with the covers and crank removed; Fig. 3 a side elevation of the machine with parts broken away, and parts in section on dotted line c—c in Fig. 2, showing the interior; Fig. 4 a water spout in cross section.

Referring to the parts of the drawing pointed out by numerals, the main tub 5, of the machine may be made of any desirable material. It is open at the top, and sets on the bottom in an upright position when in operation. It has a cover 6, and 7, both of which are used when machine is in operation. The cover 6, forms really a part of the main cover 7, by detachably fitting into a central clothes hole in the main cover. The main cover has a rail 8 on its upper face to attach a clothes wringer to when used. The design is to show that a wringer may be used and not a particular construction for holding it. The tub 5 has handles 9, 10, on the sides at the top to carry it by.

Much shorter than the height of the interior of the tub 5, is what, for convenience, I call a basket, 11. The basket is two or three inches, more or less, smaller all around than the interior of the tub 5. The top or upper end of the basket is open, and has no top closure. The basket 11 clears a little the bottom of the tub 5. It has a bearing in the center of the tub 5, on the inner bottom at 12; in which it revolves easily. It is attached to the shaft 14, the latter having easy bearings in the central hole of the cover 6, when turned by crank 15. Slantingly up and down on the exterior wall of the basket 11, are 8 open spouts 16, separated a little from each other around the basket, between it and the interior wall of the tub 5, one edge being soldered to the wall of the basket 11. The concave portion 17 of the open spout stands out from this to catch the water when the crank is turned as explained in the operation. The number of spouts 16 may vary, their arrangement is shown by top view at 16, and by downward and forward extended portions shown by dotted lines 22 Fig. 2. The free edge of the spouts 16, at 20; are turned for stiffening the spouts for handling them, Fig. 4. By referring to Fig. 3 it will be seen by the space below the covers what a freedom there is for the deliverance of much water, with great force in here over the clothes, which is forced onto and down through the clothes.

It is shown in Fig. 3 that the side wall of the basket 11 has perforations 18, and in Fig. 2 perforations 19 through the bottom. The idea is to make the basket as much as possible like open skeleton work, like open wire work, so that the dirty water from the clothes will readily mix with the water in the tub 5, and not be retained in the basket 11.

In the operation perhaps it is better to fill the basket 11, nearly full of clothes at a time. Fill the tub 5 and basket about even with top of basket with water. Add whatever soap desired. Then turn the crank 15 first in one direction, then in the other if desired, or do the washing by turning in one direction if preferred. The basket turns exceedingly easy, and the effect upon the water is to raise it by the spouts 16, up the side of the basket 11, with great force against the under face of the covers 6, 7, and it reacts down upon and through the clothes. The water has to be lifted by turning the crank, hence by turning the crank briskly the water is necessarily raised with much speed and force. The result is the short time it takes to do a washing, without boiling the clothes, just use hot water, and no damage to the clothes. As many times as the machine has to be filled with clothes in doing a washing refill with clean water.

Having thus described my invention what I claim as new and desire to secure by Letters Patent of the United States is—

1. A washing machine comprising a tub having a central bearing on the bottom thereof, an annular cover to the tub having an annular rim or flange to form a support for the clothes wringer or like device and provided with a central removable cover portion, an open work cylindrical basket adapted to act as a clothes container, a shaft passing through the basket and journaled in the bearing on the bottom of the tub, and concave curved channeled ribs secured at an incline on the exterior walls of the basket the ribs making close engagement with the walls of the tub and having reversed angular edges.

2. A washing machine comprising a tub and a central bearing on the bottom thereof, an annular cover to the tub having a central removable portion, a cylindrical basket in the tub adapted to act as a clothes container, a shaft forming a support for the basket and journaled in the bearing on the bottom of the tub and in the removable portion of the cover, a handle on the upper extended end of the shaft, and concave curved channeled ribs slantingly secured on the exterior walls of the basket, the ribs having angular stiffening edges set at an angle opposite to the channel in the ribs.

3. A washing machine comprising a tub having a center bearing on the bottom thereof, a tight fitting cover to the tub having a central removable portion, a broken annular supporting rim on the cover a shaft journaled in the bottom bearing and passing up through the removable portion of the cover, a cylindrical perforated casing carried by the shaft and having an open upper end, and concave curved channeled ribs secured at an incline to the outer walls of the casing, said ribs having overturned angular edges and making close engagement with the walls of the tub.

4. A washing machine comprising a tub having a center bearing on the bottom thereof, a tight fitting cover to the tub having its edge projecting out beyond the rim of the tub engaging the inner wall of the tub and provided with a central removable portion, a shaft journaled in the bottom bearing and passing up through the removable cover portion, a handle on the upper extended end of the shaft, a cylindrical perforated casing supported on the shaft having an open upper end to form a clothes receptacle, and concave curved channeled ribs slantingly secured to the outer walls of the casing, the ribs having reversed angular edges and making close engagement with the walls of the tub the ribs being inclined in a forward direction so that as the cylinder is revolved the water in the tub is elevated.

WILLARD C. FOSTER.

Witnesses:
LUCIUS C. WEST,
CHARLES E. MOE.

D. W. PHILLIPPY.

WASHING MACHINE.

APPLICATION FILED JUNE 1 1908

927,069.

Patented July 6, 1909.

2 SHEETS—SHEET 1

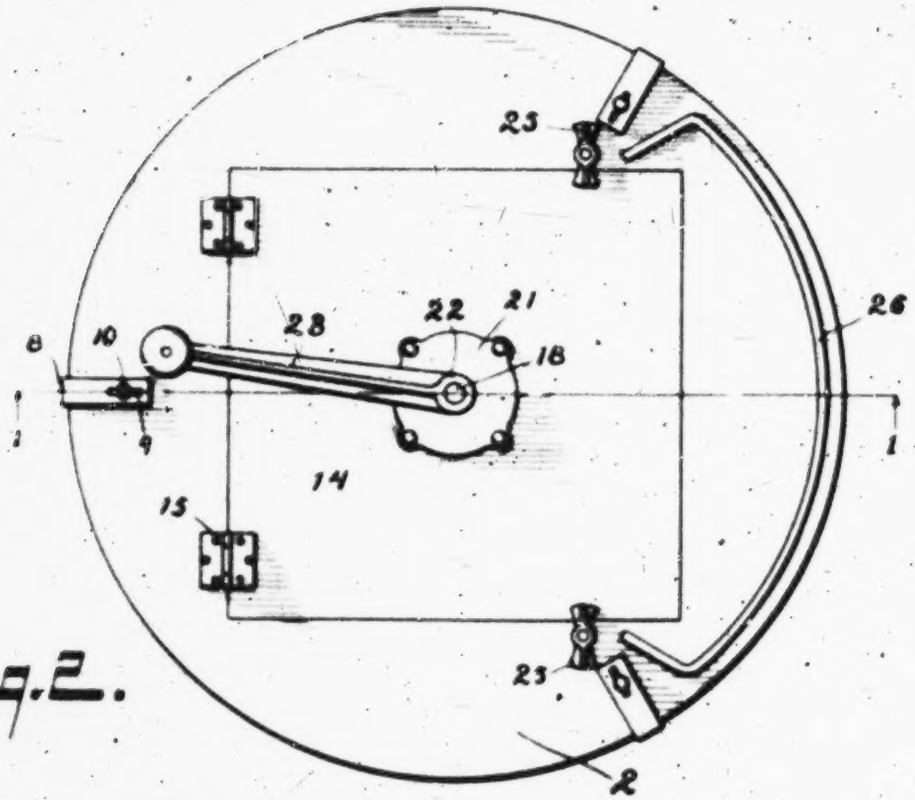

Fig. 2.

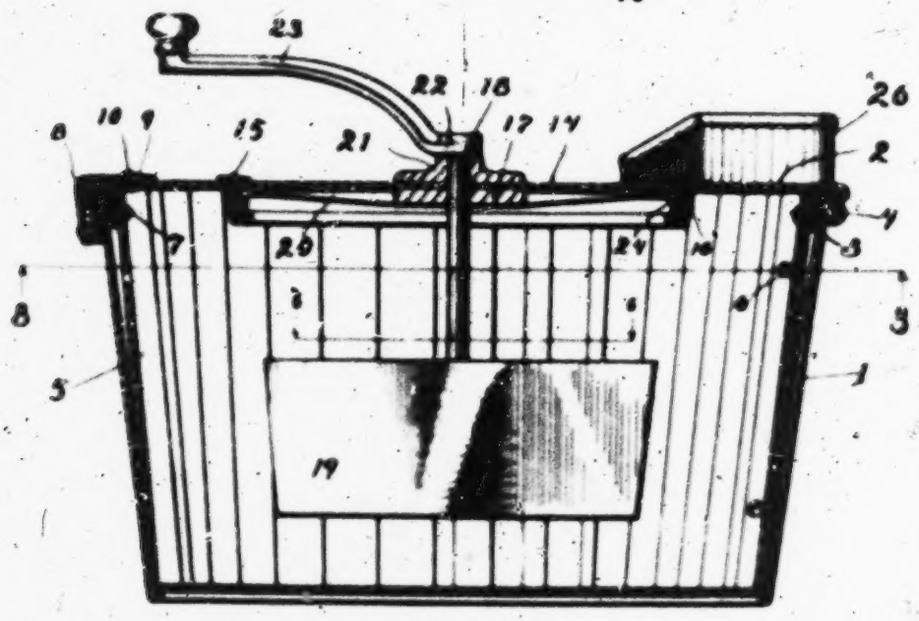

Fig. 1.

Witnesses:
Thos. A. Woodruff
Lucille S. Greenfield

David W. Phillippy
By Chappell & Co
Attorneys

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D. W. PHILLIPPY.

WASHING MACHINE.

APPLICATION FILED JUNE 1, 1908.

927,069.

Patented July 6, 1909.

2 SHEETS—SHEET 1.

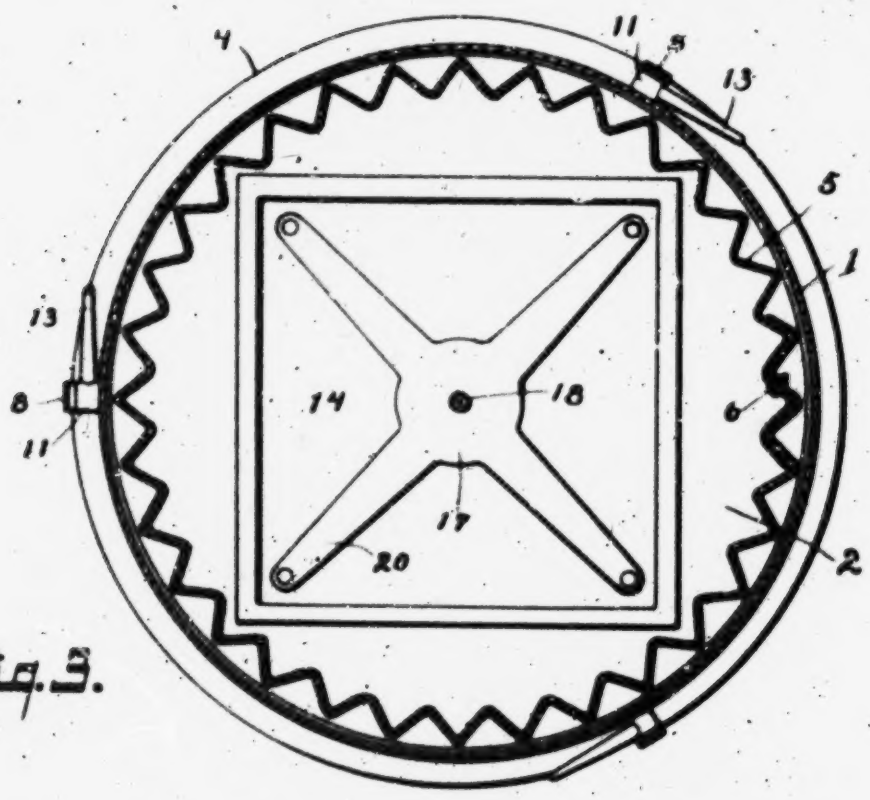


Fig. 3.

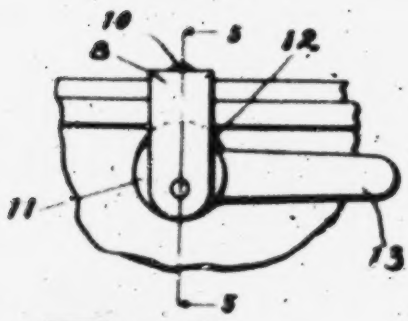


Fig. 4.

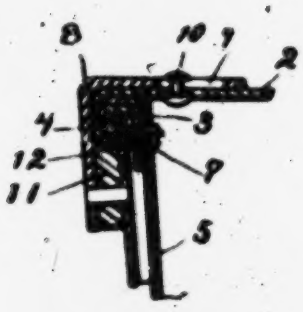


Fig. 5.

Fig. 6.

Witnesses:
Thos. Woodcroft
Luella Greenfield

David W. Phillippy
by Chappell & Co.
Attorneys

UNITED STATES PATENT OFFICE.

DAVID W. PHILLIPPY, OF KALAMAZOO, MICHIGAN.

WASHING-MACHINE.

No. 927,069. Specification of Letters Patent. Patented July 6, 1909.

Application filed June 1, 1908. Serial No. 436,978.

To all whom it may concern:

Be it known that I, DAVID W. PHILLIPPY, a citizen of the United States, residing in the city and county of Kalamazoo, State of Michigan, have invented certain new and useful Improvements in Washing-Machines, of which the following is a specification.

This invention relates to improvements in washing machines.

The main objects of this invention are: First, to provide an improved washing machine which utilizes a metal tub of ordinary construction as the main receptacle. Second, to provide in an improved washing machine an inner lining which is effectively supported and may be readily removed, and a structure which can be shipped in the knock-down or nested form. Third, to provide an improved washing machine which may be made of comparatively light material, and one which is at the same time, very strong and rigid. Fourth, to provide an improved washing machine which in construction and operation is very effective for the purpose.

Further objects, and objects relating to structural details, will definitely appear from the detailed description to follow.

I accomplish the objects of my invention by the devices and means described in the following specification.

The invention is clearly defined and pointed out in the claims.

A structure embodying the features of my invention is clearly illustrated in the accompanying drawing, forming a part of this specification, in which,

Figure 1 is a vertical section of my improved washing machine, taken on a line corresponding to line 1—1 of Fig. 2, the agitator and the crank and shaft therefor being shown in full lines. Fig. 2 is a plan view of my improved washing machine. Fig. 3 is a horizontal section, taken on a line corresponding to line 3—3 of Fig. 1. Fig. 4 is an enlarged detail elevation of one of the clamp members. Fig. 5 is a detail vertical section of one of the clamp members, taken on a line corresponding to line 5—5 of Fig. 4. Fig. 6 is a horizontal section, taken on a line corresponding to line 6—6 of Fig. 1, showing the form of the agitator.

In the drawing, the sectional views are taken looking in the direction of the little arrows at the ends of the section lines, and similar numerals of reference refer to similar parts throughout the several views.

Referring to the drawing, the tub 1 is preferably a common metal washing tub. I provide a cover 2 for the tub which is formed of sheet metal and is provided with a downwardly-projecting annular flange 3 spaced from its outer edge so that the flange projects downwardly within the tub when the cover is resting on the outturned rim 4 of the tub. This flange 3 is preferably angle-shaped in cross section and is secured to the top by turning the edge of the same downwardly and inwardly over the horizontal arm of the flange, as clearly appears in Figs. 1 and 5.

The inner wall 5 is formed of a strip of vertically-corrugated sheet metal, the ends of the strip being overlapped, as clearly appears in Fig. 3, and secured together by bolts, as 6. This makes the lining or inner wall adjustable, and also enables its being shipped in the knock-down, or in nested form, if desired,—that is, several inner walls may be nested in their set up form when disconnected from the flange 4. The walls are, therefore, preferably detachably connected to the flange by means of the bolts 7, so that the parts can be readily shipped in disassembled condition to the dealer or user, which results in great economy.

The cover is secured to the tub by means of clamps, preferably consisting of the clamp brackets 8, which are angle-shaped and provided with slots 9 in their horizontal arms, which rest on the top of the cover and are secured to the cover by means of the rivets 10 arranged through these slots, so that the brackets can be readily engaged over the rim of the tub, and also to effectively secure the tops to tubs which vary somewhat in size.

On the vertical arms of the clamp brackets, I arrange the eccentric clamps 11 having engaging lips 12 adapted to engage under the rim, thereby effectively securing the cover. These clamp eccentrics are provided with suitable handles, as 13, for convenience in manipulation. The top is provided with a door 14 which is also formed of sheet metal, being secured at one side by means of suitable hinges 15. The door opening is provided with a downwardly and inwardly turned flange 16, which forms an effective door cas-

1016

ing. This also serves to make the top rigid, the advantage of which will appear when the operation of the device is pointed out.

Centrally of the door, I arrange a bearing 17 for the shaft 18 of the agitator 19. This bearing 17 is carried by a spider 20, the arms of which extend diagonally of the door, forming rigid braces therefor as well as effective supports for the bearing. On the top side of the door is a thrust bearing 21 against which the bearing member 22 on the crank 23 is adapted to rest when the shaft 18 is in its lower position.

The door is provided with a downwardly and inwardly turned flange 24 adapted to fit in the door casing flange 15, forming an effective support for the door and a comparatively close joint therefor. The door is held in its closed position by means of suitable buttons, as 25, and the cover is also preferably provided with a wringer support 26.

In operation, the cover is secured to the tub, which effectively supports the inner wall in position. The water and the clothes are then introduced through the door, and the door is closed and secured. The shaft is axially movable in its bearings so that it may be drawn up to permit the opening of the door. After securing the door, the agitator is rotated or reciprocated by means of the crank, and this stirs the clothes in the tub and also whirls the water about in the tub, which, striking against the corrugated inner wall, is dashed back against the clothes, thereby causing a complete agitation, not only of the clothes, but of the water in the tub, so that very effective results are secured.

The device has the further advantage of not wearing the clothes as is the case where they are forcibly moved over a rubbing surface.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. In a washing machine, the combination with a tub having an outturned rim, of a top adapted to rest on said rim, said top having a downwardly-projecting flange spaced from its outer edge; an inner wall formed of a strip of vertically-corrugated sheet metal detachably secured to said flange on said top, the ends of said strip of sheet metal being overlapped and detachably connected; a plurality of angle-shaped clamp brackets arranged at the edge of said cover, the horizontal arms of said brackets having longitudinal slots therein and being adjustably secured to said cover by rivets arranged through said slots; and eccentric clamps carried by the vertical arms of said brackets adapted to engage under the rim of said tub, for the purpose specified.

2. In a washing machine, the combination with a tub having an outturned rim, of a top adapted to rest on said rim, said top having a downwardly-projecting flange spaced from its outer edge; an inner wall formed of a strip of vertically-corrugated sheet metal secured to said flange on said top; a plurality of angle-shaped clamp brackets arranged at the edge of said cover, the horizontal arms of said brackets having longitudinal slots therein and being adjustably secured to said cover by rivets arranged through said slots; and eccentric clamps carried by the vertical arms of said brackets adapted to engage under the rim of said tub, for the purpose specified.

3. In a washing machine, the combination with a tub having an outturned rim, of a top adapted to rest on said rim; a plurality of angle-shaped clamp brackets arranged at the edge of said cover, the horizontal arms of said brackets having longitudinal slots therein and being secured to said cover by rivets arranged through said slots, whereby said brackets may be adjusted to be engaged over the rim of the tub; and eccentric clamps carried by the vertical arms of said brackets adapted to engage under the rim of said tub, for the purpose specified.

4. In a washing machine, the combination with a tub, of a sheet metal top therefor having a door opening therein, the metal about said opening being turned downwardly and thence inwardly to form a door casing; a sheet metal door having downwardly-turned flanges at its edge adapted to fit said casing, a bearing arranged centrally of said door; a spider secured to the under side of said door whereby the same is braced and said bearing supported; an agitator; and a crank shaft therefor arranged through said bearing.

5. In a washing machine, the combination with a tub, of a removable top for said tub having a downwardly-projecting flange within the tub; an inner wall formed of a strip of vertically-corrugated sheet metal detachably secured to said flange on said top, the ends of said strip forming said wall being overlapped and detachably connected and means for clamping said top to said tub.

In witness whereof, I have hereunto set my hand and seal in the presence of two witnesses.

DAVID W. PHILLIPPY. [L. S.]

Witnesses:
LUELLA G. GREENFIELD,
PHINA WOODRUFF.

J. M. HOFFMAN.
WASHING MACHINE AGITATOR.
APPLICATION FILED FEB. 9, 1915.

1,157,222.

Patented Oct. 19, 1915.

Fig. 1.

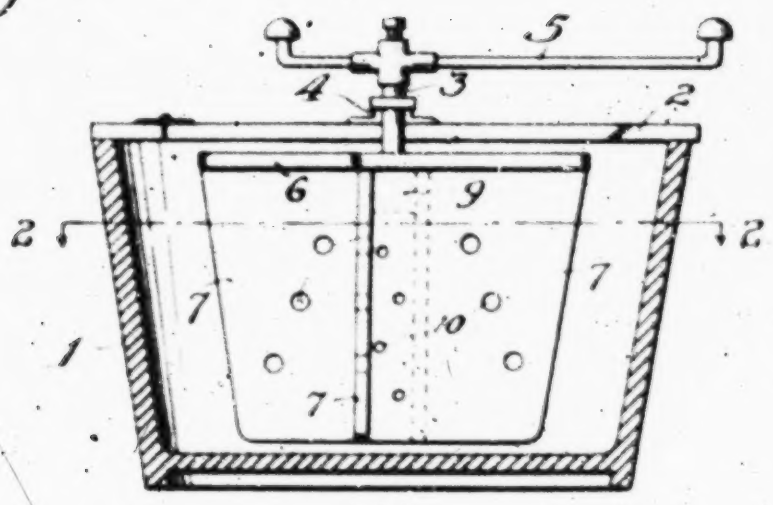
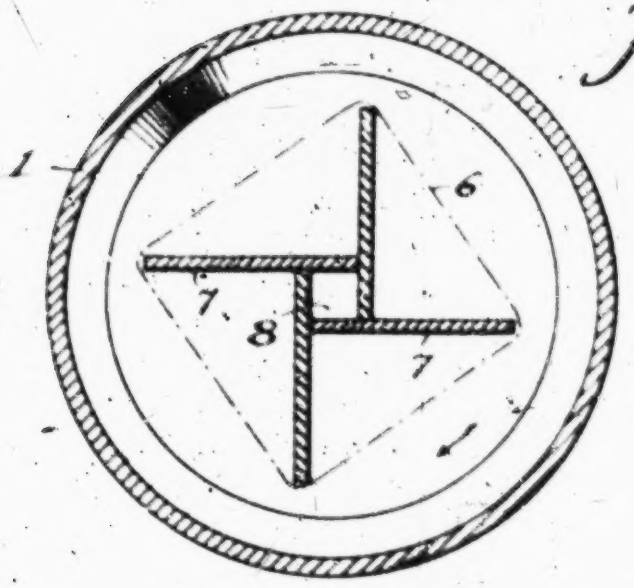


Fig. 2.



Witnesses
J. O'R. Kelly
L. C. Noyes

Inventor
Jeremiah M. Hoffman.
By Edw. Kelly.
Attorney

1018

UNITED STATES PATENT OFFICE.

JEREMIAH M. HOFFMAN, OF READING, PENNSYLVANIA, ASSIGNOR OF ONE-HALF TO HENRY HOWARD HOFFMAN, OF READING, PENNSYLVANIA.

WASHING-MACHINE AGITATOR.

1,157,222. Specification of Letters Patent. Patented Oct. 19, 1915.

Application filed February 9, 1915. Serial No. 6,935.

To all whom it may concern:

Be it known that I, JEREMIAH M. HOFFMAN, a citizen of the United States, residing at Reading, in the county of Berks and State of Pennsylvania, have invented certain new and useful Improvements in Washing Machine Agitators, of which the following is a specification.

This invention relates to improvements in washing machine agitators and the object is to provide an agitator of comparatively simple construction which may be used with equal facility in connection with washing machine tubs of various form and construction.

A principal object is to provide an agitator in which the maximum cleansing effect is produced with a minimum of effort, and to this end I have constructed a device comprising a series of vanes projecting from a common center but arranged tangential to the axis of the agitator shaft, in contradistinction to one in which such vanes radiate from said axial line.

A further object is to provide for a circulation of the washing medium through the agitator.

The construction shown and described is such that an alternate centrifugal and centripetal action of the water is produced, which, together with the proper circulation thereof, will materially aid in the washing effect and reduce the effort necessary to produce a given result.

The invention is more fully described in the following specification and clearly illustrated in the accompanying drawing, in which:—

Figure 1 is a vertical, central sectional view of a tub with my improved agitator in position therein. Fig. 2 is a sectional view taken on the line 2—2 of Fig. 1.

The numeral 1 designates a washing machine tub of ordinary construction, provided with a suitable cover 2.

The numeral 3 designates the agitator shaft which is mounted on the cover in a suitable support 4, and 5 designates an operating handle attached to the shaft and by means of which the agitator is operated.

To the lower end of the shaft 3 I attach my agitator which comprises a cover or top piece 6 and a plurality of vanes or blades 7. The top piece is preferably secured to the upper edges of the blades and acts as a cover or top of the spaces formed between the side walls of the blades, as shown in Fig. 2 in dotted lines.

The blades of the agitator are arranged in a line tangent to the axial center line of the agitator shaft, and thus form, when four blades are used as in the present instance, a substantially rectangular opening in the center, indicated by the numeral 8. The upper end of this opening is preferably closed by a plug 9 to which the shaft may be more securely attached and also to serve as a closure for the space 8.

The blades are formed, each with a series of perforations 10 in their projecting ends, and also with a series of like perforations in close proximity to their inner ends where they form the walls of the space 8.

The agitator is moved to and fro, producing an oscillatory movement as is usual in such instances, and the clothing together with the cleansing element contained in the tub is agitated. When the agitator is moved in one direction, that indicated by the arrow in the drawing, the effect on the contents of the tub is to force said contents toward the tub wall with a centrifugal action, due to the fact that the surfaces of the blades producing the action extend to a point slightly beyond the axial center, while, when the direction of the agitator is reversed, and the smaller surfaces of the blades act directly on the contents, the larger spaces behind each blade will produce a suction which will tend to draw the contents toward the center of the tub, and while both of these movements are being produced, the water will circulate freely up through the center 8 of the agitator and out through the perforations in the blades. The perforations in the projecting portions of the blades will permit the free movement of the agitator and also aid in forcing the water through the clothing as the agitator moves. It is evident therefore, that with the alternating centrifugal and centripetal action produced, the cleansing effect produced with a given effort, approaches the maximum, as the clothing will not be permitted to mass or become tightly rolled, while the complete circulation of the water aids materially in producing the cleansing effect.

Having thus fully described my invention, what I claim is:—

1. An agitator for washing machines comprising four vertical blades joined at their inner extremities in a manner to form a rectangular space or opening, said inner ends being perforated whereby a circulation of liquid may be had through said rectangular opening.

2. In a washing machine agitator, a centrally disposed shaft, a top piece to which the shaft is attached, and a plurality of blades secured to the under side of the top piece and arranged tangentially to the axial line of the shaft, the inner edges of which blades extend beyond said axial line and form a hollow space in the center of the agitator, said blades being perforated to permit circulation of liquid through said space.

In testimony whereof I affix my signature in presence of two witnesses.

JEREMIAH M. HOFFMAN.

Witnesses:
ED. A. KELLY,
MARY E. STAUFFER.

9101

1020.

G. W. LEWIS.

WASHING MACHINE.

APPLICATION FILED JULY 17, 1916.

1,262,962.

Patented Apr. 16, 1918.

2 SHEETS—SHEET 1.

Fig 2.

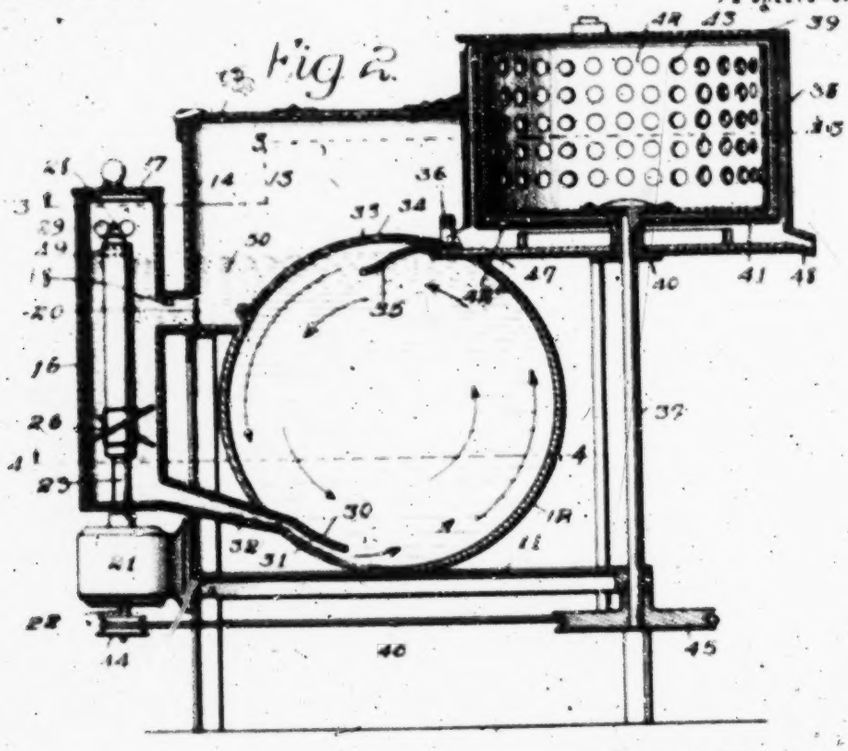
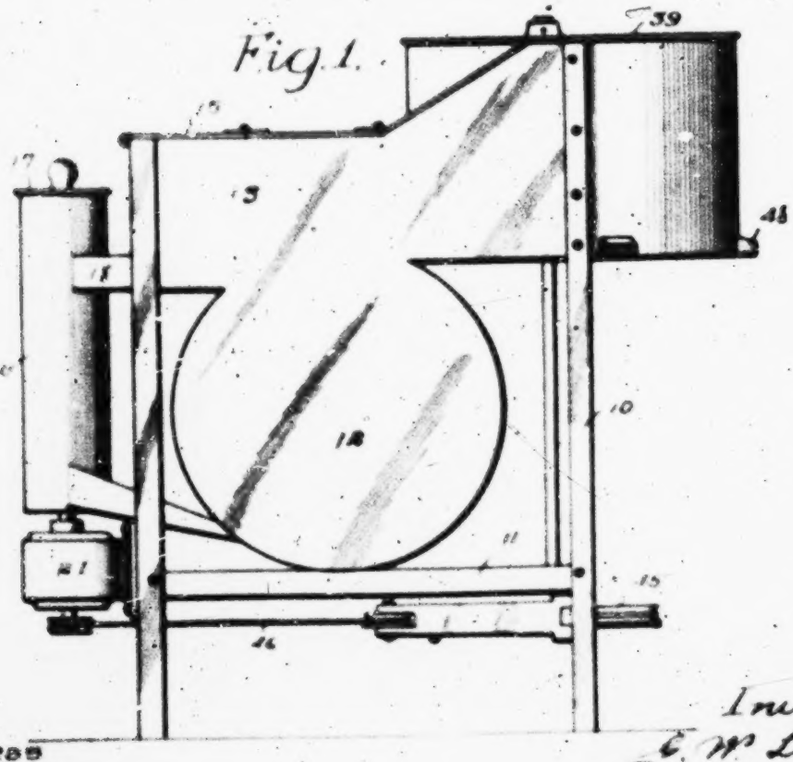


Fig 1.



Witness
A. G. Hagner

Inventor
G. W. Lewis
by Owing & Barrallip

1021

G. W. LEWIS.

WASHING MACHINE.

APPLICATION FILED JULY 17, 1916.

1,262,962.

Patented Apr. 16, 1918.

2 SHEETS—SHEET 2.

Fig 6.

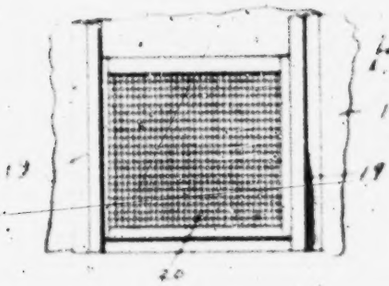


Fig 5.

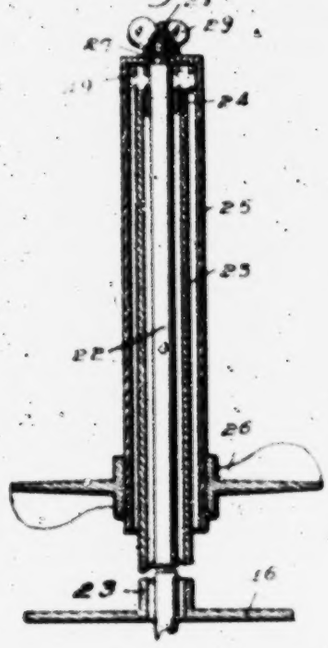
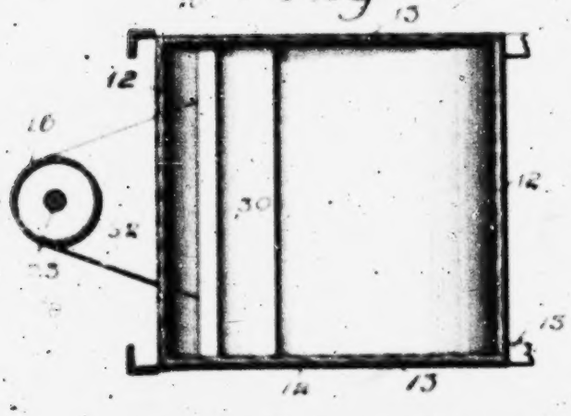


Fig 4



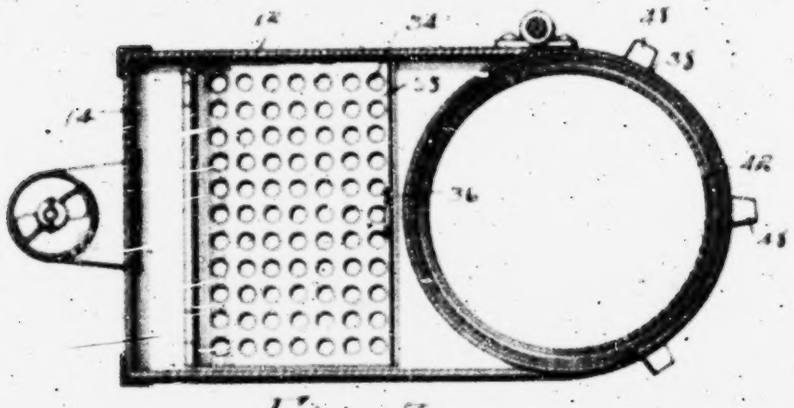


Fig 3

Witness
A. G. Hagen

Inventor
G. W. Lewis
by Owen & Barrett

1022

UNITED STATES PATENT OFFICE.

GEORGE W. LEWIS, OF GRINNELL, IOWA, ASSIGNOR TO GRINNELL WASHING MACHINE COMPANY, OF GRINNELL, IOWA.

WASHING-MACHINE.

1,262,962. Specification of Letters Patent. Patented Apr. 16, 1918.

Application filed July 17, 1916. Serial No. 109,673.

To all whom it may concern:

Be it known that I, GEORGE W. LEWIS, a citizen of the United States, and resident of Grinnell, in the county of Poweshiek and State of Iowa, have invented a certain new and useful Washing-Machine, of which the following is a specification.

The object of my invention is to provide a washing machine of simple, durable and inexpensive construction, of the kind designed to be operated by power derived from a small electric motor, internal combustion engine or the like, and especially adapted for domestic laundry purposes.

A further object is to provide a washing machine of this kind in which the clothes during the washing process will be maintained in a loose condition not matted or massed together, so that the soapy water may be forced through every particle of the clothes to loosen the dirt and remove it from the clothes.

A further object is to provide a washing machine of this character in which delicate garments will not be injured by being rubbed upon roughened or corrugated surfaces, or torn by the action of mechanical agitators, and at the same time to provide means whereby rapidly moving currents of soapy water will be forced through every particle of the fabric and all parts of the fabric will be successively presented to this action of the forced currents of soapy water.

A further object is to provide a washing machine of this class in which the clothes being washed cannot become lodged in any part of the clothes container, and particularly cannot become lodged or held at the water outlet openings of the clothes container.

A further object is to provide a washing machine having its body so shaped and arranged as to provide also a container for an inclosed centrifugal extractor or wringer.

A further object is to provide improved means for forcing currents of water through the clothes container by means of a small electric motor connected direct to a water propeller without any gears or working parts likely to get out of order or to be noisy, and also to provide a water propelling means so arranged that it may be operated without packing joints which might leak or require readjustment or repacking, which would cause unnecessary friction.

My invention consists in the construction, arrangement and combination of the various parts of the device whereby the objects contemplated are attained, as hereinafter more fully set forth, pointed out in my claims, and illustrated in the accompanying drawings in which:

Figure 1 shows a side elevation of a washing machine embodying my invention.

Fig. 2 shows a central, longitudinal, vertical sectional view of the same.

Fig. 3 shows a horizontal sectional view on the line 3—3 of Fig. 2.

Fig. 4 shows a horizontal, sectional view on the line 4—4 of Fig. 2.

Fig. 5 shows a detail, vertical, sectional view illustrating the motor shaft and the means for connecting it to the propeller without gears or packing devices, and

Fig. 6 shows a detail view illustrating the screen between the overflow compartment and the water propeller compartment.

Referring to the accompanying drawings, I have used the reference numeral 10 to indicate the upright frame members of the machine and 11 the horizontal frame members. Mounted in the central portion of the frame is a clothes containing cylinder 12, arranged horizontally and preferably made of sheet metal closed at both ends and open at its top. The ends of the cylinder 12 are extended upwardly and form the sides 13 of the overflow compartment. This overflow compartment extends a considerable distance above the top of the cylinder 12 and one end thereof is closed by the wall 14 and the other end by the extractor compartment hereinafter described.

Hinged to the wall 14 is a sectional cover plate 15, the parts of which are hinged to each other, as shown in Fig. 2, which cover may be raised to provide access to the overflow compartment 13.

At one end of the washing machine body is an upright cylindrical propeller containing chamber 16, having a detachable top 17 and also having a communicating tube 18 connecting it with the overflow chamber at a point below the top of the clothes containing chamber 12. Arranged in this communicating tube 18 is a screen 20, slidably mounted in guides 19 arranged on the end wall 14, so that the screen may be raised and lowered to cover or uncover the communicating tube 18.

Mounted on the machine frame directly beneath the propeller containing chamber 16 is a small electric motor 21; having a shaft 22. This shaft 22 extends upwardly to a point near the top of the chamber 16 and has mounted on its upper end a tube 25 of considerably larger diameter than the shaft, and spaced apart from the shaft. The upper end of this tube is fixed to the shaft 22 by means of the winged nut 29 mounted on the screw-threaded upper end 28 of the shaft 22 to hold the top of the tube 25 firmly against the shoulder 27 of the shaft 22.

On the lower end of the tube 25 is a water propeller 26, of ordinary construction.

The bottom of the cylindrical chamber 16 is formed with an opening through which the shaft 22 extends, and a tube 23 surrounds the shaft but is spaced apart from it and is connected to the bottom member of the chamber 16. This tube 23 extends upwardly inside of the tube 25 and is provided at its upper end with a bearing 24 for the upper end of the shaft 22. The upper end of the tube 25 is perforated to permit the escape of water that backs up through the tube 25 and around the tube 23 on account of the pressure from the propeller 26, otherwise the water would fill the space between the bearing 24 and the tube 25 and run down between the bearing and shaft into the motor.

By this arrangement it is obvious that the tube 23 performs the double function of providing a bearing for the upper end of the shaft 22 and at the same time it prevents the water in the chamber 16 from leaking out through the opening in the chamber 16 and through which the shaft 22 is projected.

At the bottom of the propeller chamber 16 there is a passageway 32 leading from the chamber 16 to the interior of the clothes container. This passageway is tapered, as indicated in Figs. 2 and 4, and is widest at its discharge end on the interior of the clothes container, there being in the clothes container at such discharge end a narrow slot 31 extending the full width of the clothes container and covered by a deflector 30, which prevents clothes from entering the slot and which also gives a proper direction to the current of water that is forced into the clothes container.

At the top of the clothes container is a hinged cover 33 provided with perforations 34 and with a resilient deflector plate 35. This deflector plate is connected to the free edge of the cover and is inclined downwardly and in a direction toward the water propeller, as clearly shown in Fig. 2. A handle 36 is provided on the upper part of the free edge of the hinged cover.

At the end of the frame opposite from the propeller is the wringer which comprises an upright shaft 37 having fixed to its upper end a clothes containing cylinder 42 provided with perforations 43. This shaft 37 extends through a bearing 40 and has at its lower end a pulley 45 connected by a belt 46 with a pulley 44 on the lower end of the motor shaft 22.

The cylindrical clothes container 42 is open at its top and is contained within a water distributing cylinder 41. This water distributing cylinder is open at its top and has a single opening 42ª in its bottom. It is rotatably mounted with relation to the clothes container 42, so that it may be turned to any desired position. This cylinder 41 is also contained within a stationary cylindrical chamber 38 having an adjustable top 39 and a series of discharge spouts 48 leading to points away from the clothes container, and a discharge spout 47 leading to the clothes container. The clothes to be dried are placed in the receptacle 42, and as this receptacle is rotated the water is thrown from them by centrifugal action into the cylinder 41. The water in this cylinder then runs through the opening 42 into one or the other of the discharge spouts 47 and 48, depending upon the position in which the cylinder 41 has been placed, so that if desired the water from the clothes may be returned to the washing machine clothes container or may be discharged into the other tubs or receptacles.

In practical operation I first preferably fill the container with soapy water to a point approximately level with the top of the clothes container, so that some water will be in the overflow receptacle at the point marked 50 in Fig. 2. Then the clothes to be cleaned are placed within the clothes receptacle and the motor 21 is started. This causes the propeller 26 to be rapidly rotated and a current of water is forced downwardly through the passageway 32 and is guided by the deflector plate 30 in a circular direction around the interior of the clothes container. The water and clothes are then continuously carried around in the soapy water, and when the clothes strike the deflector plate 35 at the top of the clothes container they will be deflected downwardly and inwardly toward the center of the clothes container. This accomplishes several desirable results. First, the water is being rapidly forced out through the openings 34 in the top 33, and this deflector 35 prevents the clothes from being held against the inside of the cover by these currents of water; and second, the deflector 35 engages the clothes and slightly retards the parts thereof which are thus engaged, permitting the parts that are not in contact with the deflector to move ahead faster than the parts that are in contact, thus causing the clothes to be turned over and to be given a somewhat independent rotary motion of their own within the container, with the effect that each time that the clothes

around inside of the container, a complete circle, some parts of the clothes or of the outer layer of clothes, will be engaged by this deflector plate and retarded and turned over, whereby new surfaces or new clothes are exposed for the action of the current of soapy water. The water that passes out through the cover 33 flows through the passageway 18 back into the propeller container. This independent rotary motion of the clothes is further obtained by the use of the yielding deflector plate. As the clothes circle around the clothes container, they strike the deflector plate and stop. They are then held until sufficient clothes have been accumulated so that the increased water pressure against the consequent area of clothes will press up the deflector plate and allow the clothes to pass around and downwardly. Experience shows that the yielding deflector plate accomplishes this result much better than a stationary one.

I have found that in practice the action of the propeller on the soapy water creates a very large amount of suds with a comparatively small amount of soap, and that in doing an ordinary washing with my improved machine very satisfactory results can be obtained by the use of about half the amount of soap that is required in washing machines that depend for their action on rubbing processes.

Another advantage gained by my improved washing device is that the clothes are cleaned very quickly and thoroughly, probably due to the facts that the clothes never become massed or pilled compactly in any part of the tub, and various layers of the clothes stand spread apart from each other as they travel around within the tub and new surfaces are constantly being presented to the action of the water currents.

The specific gravity of ordinary garments is somewhat greater than that of the water, and hence they tend to sink to the bottom of the tub. However, by means of my improvement it does not matter whether the clothes are of greater or less specific gravity than the water, because they are constantly being forced up and down within the tub from the bottom to the top of the container.

One of the advantages of my invention is that a comparatively small clothes container may be used to hold a comparatively large amount of clothes, because there is nothing within the container to occupy space, such for instance, as the agitators or rubbing devices, ordinarily employed in washing machines and contained within the tub. In my improvement the entire space within the clothes container is occupied by the clothes and soapy water.

There is a material advantage in my improved construction in having both the clothes container and the overflow chamber. The overflow chamber is important because it provides a space for the suds that are being made in such large quantities when clothes are being washed, and prevents this suds from overflowing, and at the same time this overflow chamber provides means whereby the clothes container may be filled to a point approximately near its top, but it does not matter particularly whether it is filled slightly above or slightly below the top of the clothes container. Hence without the overflow chamber it would be difficult to get just exactly the right amount of water in the clothes container.

Another advantage of my invention is that by providing the three essential parts, to wit the clothes container, the overflow chamber and the extractor containing chamber, all mounted on the same frame and communicating with each other, these parts are all intimately associated and connected with each other and make for convenience and economy.

I have in a separate application set forth more particularly the structural details of the extractor mechanism and have not claimed the extractor specifically in this application, but it is shown herein and described solely for the purpose of showing its arrangement and combination with the overflow chamber and the clothes container.

I claim as my invention:

1. In a washing machine, the combination of a substantially cylindrical clothes container, having its axis arranged horizontally, there being perforations in the top of said clothes container, a water conducting means communicating with said perforations and also communicating with the interior of the clothes container near the bottom thereof, and means in said water communicating chamber for forcing a current of water downwardly through it.

2. In a washing machine, the combination of a substantially cylindrical clothes container, having its axis arranged horizontally, there being perforations in the top of said clothes container, extending to a point below the top of the interior of the container, a water conducting means communicating with said perforations and also communicating with the interior of the clothes container near the bottom thereof, means in said water communicating chamber for forcing a current of water downwardly through it, and a yielding deflector adjacent to said perforations.

3. A washing machine comprising a substantially cylindrical clothes container with its axis arranged horizontally, the top of said container being open, a hinged perforated cover for the top, the perforations therein extending to a point below the interior of the top so that water moving through the container in a circular direction

around a horizontally arranged axis will pass out of the container through said perforations, a deflector connected with the hinged cover adjacent to the perforations, an upright chamber at the side of the clothes container, communicating at its upper portion with said perforations, and also communicating at its lower portion with the interior of the clothes container, and means in said upright chamber for forcing a current of water downwardly through it.

4. A washing machine comprising a substantially cylindrical clothes container with its axis arranged horizontally, the top of said container being open, a hinged perforated cover for the top, the perforations therein extending to a point below the interior of the top so that water moving through the container in a circular direction around a horizontally arranged axis will pass out of the container through said perforations, a deflector connected with the hinged cover adjacent to the perforations, an upright chamber at the side of the clothes container, communicating at its upper portion with said perforations, and also communicating at its lower portion wth the interior of the clothes container, means in said upright member for forcing a current of water downwardly through it, means for connecting the upright chamber with the clothes container, comprising a narrow slotted discharge opening of a length substantially that of the length of the clothes container, and a deflector adjacent to said slot within the clothes container to deflect the water in a circular direction around the interior of the clothes container.

5. In a washing machine, the combination of a clothes containing chamber, an upright tube adjacent to the clothes containing chamber and communicating with it at both ends, an upright shaft extended through said tube, a small tube surrounding the shaft and forming a water-tight joint with the bottom of the said upright tube, a bearing at its upper end for the shaft, a hollow shaft fixed to the upper end of the said shaft and extended downwardly over the tube surrounding the shaft to a point near the bottom of the upright tube, and a propeller on the lower end of said hollow shaft, for the purposes stated.

Des Moines, Iowa, June 5, 1916.

GEORGE W. LEWIS.

F. E. WOLCOTT.

WASHING MACHINE.

APPLICATION FILED AUG. 13, 1919.

1,390,224.

Patented Sept. 6, 1921.

2 SHEETS—SHEET 1

Fig. 1.

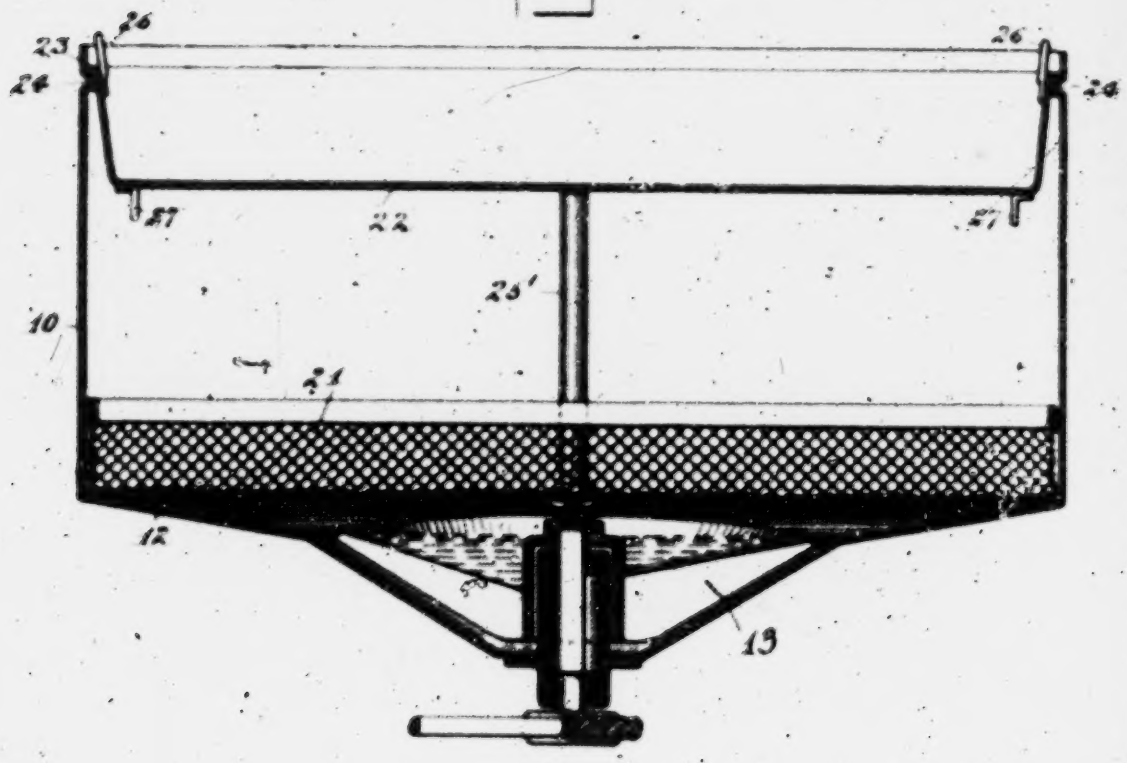
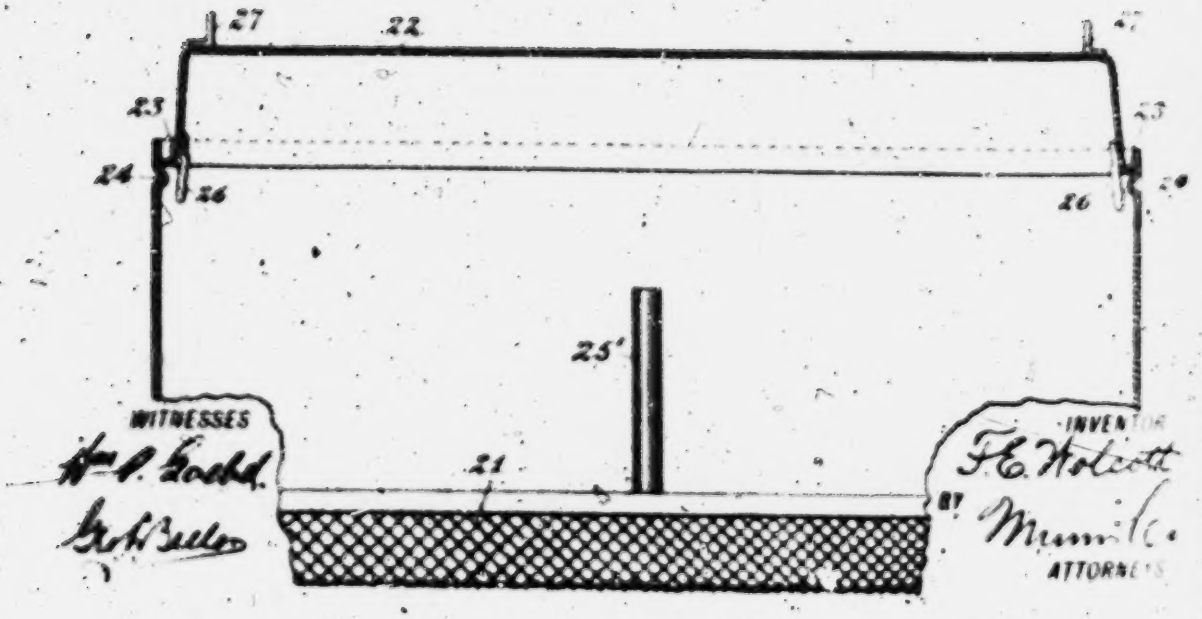


Fig. 2.



F. E. WOLCOTT.

WASHING MACHINE.

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2 SHEETS. SHEET 2.

Fig. 3.

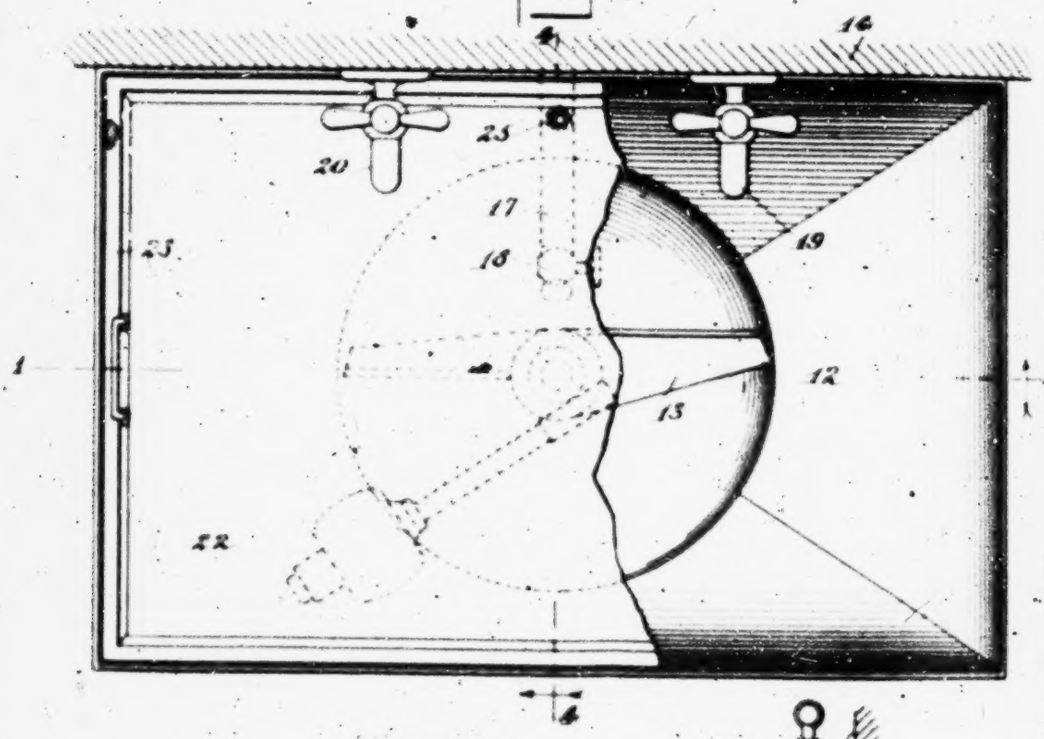
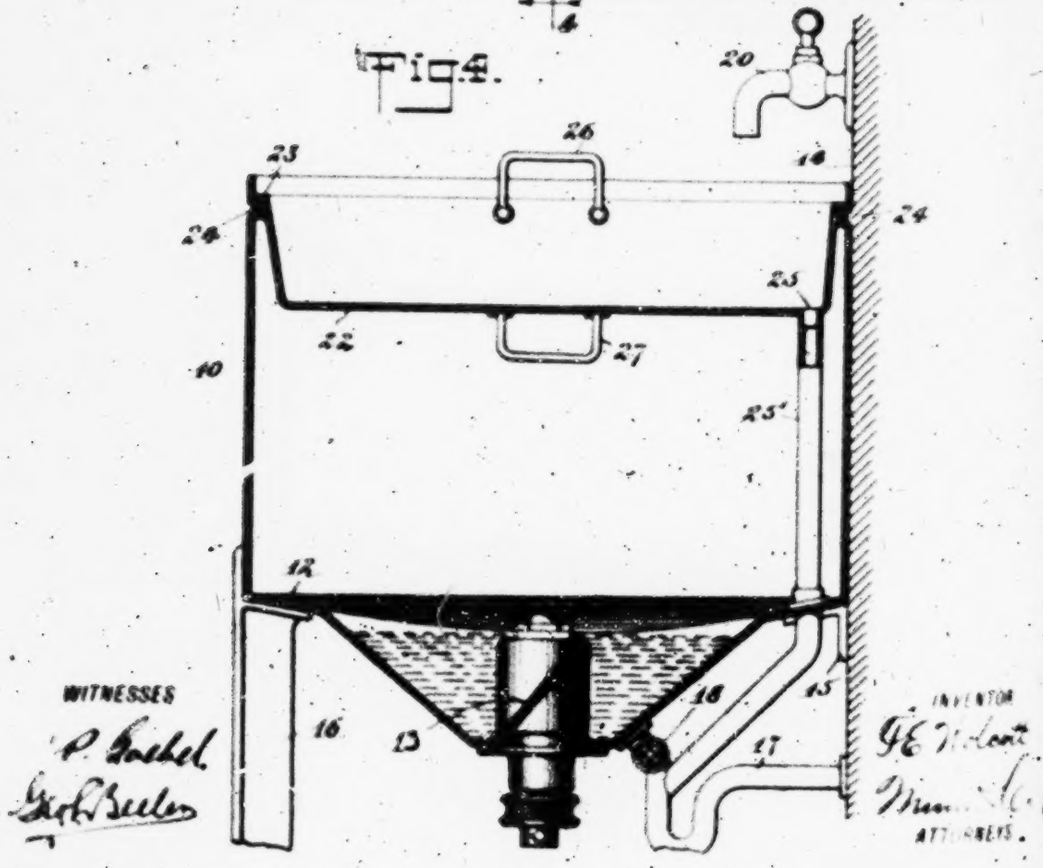


Fig. 4.



WITNESSES

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1028

UNITED STATES PATENT OFFICE.

FRANK E. WOLCOTT, OF HARTFORD, CONNECTICUT.

WASHING-MACHINE.

1,390,224. Specification of Letters Patent. Patented Sept. 6, 1921.

Application filed August 13, 1919. Serial No. 317,207.

To all whom it may concern:

Be it known that I, FRANK E. WOLCOTT, a citizen of the United States, and a resident of Hartford, in the county of Hartford and State of Connecticut, have invented a new and Improved Washing-Machine, of which the following is a full, clear, and exact description.

This invention relates to washing machines generally, whether for washing dishes or the like, or for laundry or other purposes.

Among the objects of the invention is to provide a novel construction embodying in one and the same device all of the essential features of a sink and a washing machine adapted for interchangeable use as either.

More specifically stated in the practice of this invention I contemplate installing a washing machine as a permanent fitting of a dwelling house or the like, and adapting the same for use as a sink whereby the water for the machine, either hot or cold, may be drawn directly from the wall faucets as commonly installed; and the drainage from the machine will be connected to the waste pipe ordinarily employed to lead from the bottom of the sink.

With the foregoing and other objects in view the invention consists in the arrangement and combination of parts hereinafter described and claimed, and while the invention is not restricted to the exact details of construction disclosed or suggested herein, still for the purpose of illustrating a practical embodiment thereof reference is had to the accompanying drawings, in which like reference characters designate the same parts in the several views, and in which—

Figure 1 is a vertical longitudinal section on the line 1—1 of Fig. 3.

Fig. 2 is a similar view, but with the cover member inverted.

Fig. 3 is a plan view of the device arranged as in Fig. 1 and with parts broken away; and

Fig. 4 is a vertical transverse section on the line 4—4 of Fig. 3.

Referring now more specifically to the drawings I show my present construction as comprising a receptacle 10 having a bottom with a central conical portion 11 and a surrounding deck portion 12, or as more fully set forth in my co-pending application Serial No. 317,206, of even date herewith, and designed to accommodate a dasher or impeller 13 having preferably the characteristics as to location, functions and operating means as fully set forth in my co-pending application Serial No. 317,205.

As above premised the principal characteristics of this specification, distinguishing it from the others referred to, relate to the receptacle for use specifically as a sink or as a substitute for a sink and possessing peculiar features of adaptability for dwelling houses or small city apartments where the element of room or space is of paramount importance.

The receptacle 10 consequently is designed to be supported near or against a wall 14, as upon brackets 15 and legs 16 or any other suitable supporting means. From the bottom extension 11 leads a vent or sewer connection 17 similar to the usual outlet for a sink and this vent may be guarded by a plug or cock 18 of any convenient nature providing for the closure of the bottom or opening thereof to discharge the contents of the receptacle. Consequently as indicated I provide for the receptacle hot and cold water faucets 19 and 20 or arrange the receptacle beneath faucets already installed, whereby hot or cold water, or both may be delivered directly into the receptacle as in a sink. For the washing of dishes for example the commodities to be washed are put into a tray 21 of open mesh or reticulated structure the same being removably placed upon the bottom or deck 12 of the receptacle in position for the washing solution admitted into the receptacle from the faucets, to be dashed over or through the same by the operation of an impeller 13 or any modification that may be required according to the commodities to be cleansed. During the cleansing operation any suitable cover may be provided over the top of the receptacle to prevent the splashing therefrom of the water.

As a preferred type of cover I employ for this purpose a pan like device 22 having the appearance and general functions of an ordinary sink and of a depth for instance of about four inches. The periphery of the cover is shown as of an outwardly projecting flange 23 adapted to be supported directly upon a crimp or bead 24, or its equivalent, carried by the upper portion of the receptacle. This makes a satisfactory support for the cover in any adaptation thereof and also constitutes a barrier preventing the splashing of the water from the receptacle.

This cover as stated for ordinary household purposes may constitute a sink and for this purpose there is provided at any convenient portion of the bottom an outlet 25 projecting into a tube 25' from which it will find its exit through the vent 17. Because of the form and capacity of the receptacle a single tray 21 is sufficient for ordinary purposes for accommodating the articles to be washed, but if additional space is required for the accommodation of extra dishes or pans to be washed at the same time as the dishes, the cover 22 may be inverted and supported as indicated in Fig. 2 thereby increasing the capacity of the receptacle by about eight inches of height in the illustration stated. Any suitable handles 26 and 27 may be secured to the top and bottom portions of the cover for the manipulation thereof in any position.

I claim:

1. A washing machine comprising a receptacle having a recess in its bottom, a rotatory impeller for water in said recess, a recessed cover for preventing the outflow of agitated water when the impeller is rotated, said cover being shaped to fit within the top of the receptacle, whereby the cover may be set in the receptacle and utilized as a sink or may be inverted and set on the receptacle to increase the capacity of the inclosed space, a drain outlet for the receptacle, a drain outlet for the cover and means for connecting said outlets.

2. The machine described in claim 1 characterized by having the receptacle provided with an interior shoulder near its upper edge and the cover provided with a flange upon its outer edge which flange is shaped to fit within the receptacle and rest upon the shoulder therein whether the cover is located for use as a sink or is inverted to increase the inclosed capacity of the receptacle.

FRANK E. WOLCOTT.

June 19, 1923.

1,459,483

C. C. UNRUH

DOLLY FOR WASHING MACHINES

Filed Jan. 22, 1923

Fig 1

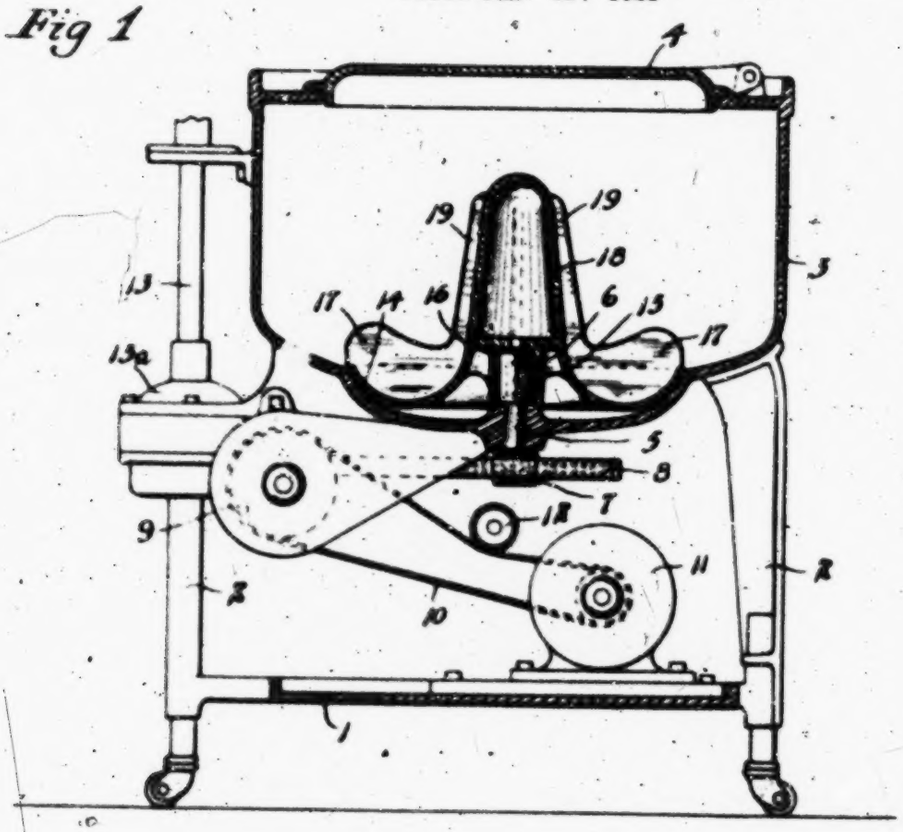


Fig 2.

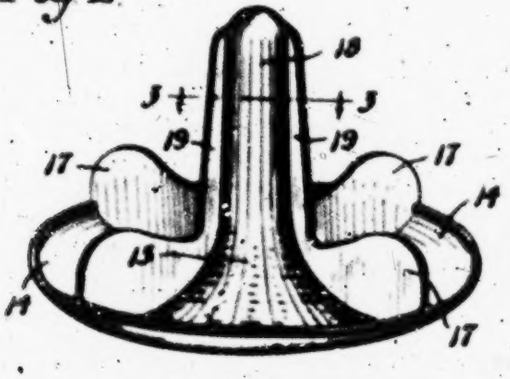
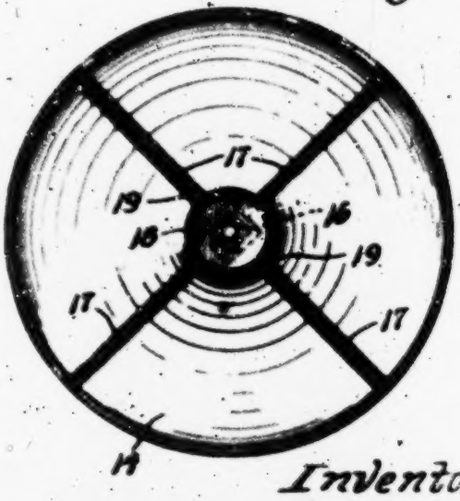


Fig 3.



Inventor

C. C. UNRUH

BY HIS ATTORNEY

James F. Williamson

1031

Patented June 19, 1923. 1,459,483

UNITED STATES PATENT OFFICE.

CORNELIUS C. UNRUH, OF FREEMAN, SOUTH DAKOTA.

DOLLY FOR WASHING MACHINES.

REISSUED

Application filed January 22, 1923. Serial No. 614,128.

To all whom it may concern:

Be it known that I, CORNELIUS C. UNRUH, a citizen of the United States, residing at Freeman, in the county of Hutchinson and State of South Dakota, have invented certain new and useful Improvements in Dollies for Wasning Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to a washing machine and particularly to that type of machine in which the articles to be washed are contained in a receptacle having a moving member or dolly therein for agitating the articles and water. The invention is especially directed to a novel form of such moving member or dolly. In the type of machine disclosed, it has heretofore been the practice to use a dolly which was oscillated or gyrated on a central spindle, which dolly comprised a dish-shaped member having a central upstanding hub portion therein, thus forming an annular trough which was traversed by vertical blades. Such a type of dolly was and is being used in the well known Maytag washing machine which is now upon the market. It has been found by experience that with such a dolly the clothes tend to accumulate in a knot or tangle above the dolly and by means of the present invention this objectionable action has been overcome.

It is an object of this invention, therefore, to provide a washing machine dolly or agitating member of the movable type which will efficiently agitate the water and clothes and yet will not cause any objectionable action thereof.

It is a further object of the invention to provide such a dolly comprising a central upstanding stem having radial ribs projecting therefrom and extending along the sides thereof.

It is more specifically an object of the invention to provide such a stem preferably of cylindrical form, the surface of which merges into the surface of the dish-shaped dolly and the ribs on which are integral and continuous with the ribs extending across the dish-shaped portion of the dolly.

These and other objects and advantages of the invention will more fully appear from the following description made in connection with the accompanying drawings in which like reference characters refer to the same parts throughout the different views, and in which,

Fig. 1 is a view partly in elevation and partly in central vertical section of one type of washing machine showing the invention applied thereto;

Fig. 2 is a perspective view of the dolly detached from the machine; and

Fig. 3 is a horizontal section of the dolly taken substantially on the line 3—3 of Fig. 2.

Referring to the drawings, in Fig. 1 a washing machine is shown comprising a frame having a base plate 1 with legs 2 projecting upwardly therefrom, being provided with casters at their lower ends. A receptacle 3 adapted to contain water and the articles to be washed is mounted upon the legs 2 and, as shown, is provided with a hinge cover 4 at the top thereof. The lower portion of the receptacle 3 is provided with a dish-shaped recess having a central hub in which is journaled a driving shaft 5 having an angularly-shaped portion 6 extending upwardly into the receptacle and having a pinion 7 secured to its lower end. The pinion 7 is arranged to mesh with a rack member 8 which is reciprocated by being attached at one end to a crank disk driven from a pulley 9 indicated in dotted lines in Fig. 1, which pulley is, in turn, driven by a belt 10 from a suitable motor 11 secured to the base 1. A tightening pulley 12 for said belt is also illustrated. A driving shaft 13 extends upwardly from certain gearing enclosed in a casing 13ª for the purpose of driving a wringer which will be attached to the machine. The driving mechanism forms no part of the present invention and is merely illustrated to show how the dolly member is driven.

The dolly member, as illustrated, comprises a cup-shaped or dish-shaped member 14 of a size and form to be disposed substantially in the recess in the bottom of the receptacle 3. The member 14 has an upstanding central portion 15 at the center thereof, the vertical elements of which are concave so that the surface thereof merges into the surface of the member 14 and forms, in effect, an annular trough. The underside of the portion 15 is provided with a sleeve or hub 16 having an angular recess therein so that said sleeve is adapted to fit over the angular portion 6 of the shaft 5, and be sup-

ported on the central hub at the bottom of the receptacle 3. A plurality of radial ribs 17 of lobe shape formation extend across the surface of the members 14 and 15 having their wider and curved ends disposed outwardly and rising above the outer edge of the member 14. A stem 18 is shown projecting upwardly from the portion 15 and centrally thereof, which stem is illustrated as circular in cross section although the same may be made of any other shape in cross section, if desired. The surface of the stem member is continuous with the surface of the member 15 and, as illustrated, said stem is substantially cylindrical having a slight upward taper. Said stem is provided with radially projecting rib or wing members 19 of small thickness, which ribs extend along the sides of said stem and increase in radial thickness slightly toward the lower end thereof, said lower ends merging into the inner ends of the ribs 17 so that the two form, in effect, one continuous rib. As clearly shown in Figs. 1 and 3, the stem portion 18 is preferably formed hollow and the dolly may be made of any suitable material, preferably metal.

In the operation of the machine, the motor 11 is operated and power transmitted through the described gearing to reciprocate the rack 8. This rack, being held in engagement with the pinion 7 the dolly member is given an oscillating movement, thus agitating the water and articles in the receptacle 3. By providing the upwardly projecting stem 18 with its ribs 19, the clothes are kept distributed in the trough formed about the dolly and do not become tangled in a central wad or knot as in the dollies heretofore used which were not provided with said stem.

It is seen, therefore, that the applicant has provided a simple and efficient form of dolly and one constituting a great improvement on those previously used. The change in the dolly does not add appreciably to the cost thereof or the difficulty of making and the improved dolly can readily be substituted for the old form.

The invention has been demonstrated in actual practice and found to be very successful and efficient for the purpose intended.

It will, of course, be understood that various changes may be made in the form, details and proportions of the parts without departing from the scope of applicant's invention, which, generally stated, consists in the matter shown and described and set forth in the appended claims.

What is claimed is:

1. A dolly for a washing machine adapted to be disposed in a liquid containing receptacle with its top portion well below the top of said receptacle comprising a dish-shaped member and a substantially cylindrical stem rising from and merging into the central portion thereof and terminating in an upper rounded end, said stem having spaced ribs extending vertically along its sides upwardly tapered throughout the length of said stem and extending outwardly across the dish-shaped member.

2. A dolly for a washing machine adapted to be disposed in a liquid containing receptacle with its top portion well below the top of said receptacle comprising a dish-shaped member and a substantially cylindrical stem rising from and merging into the central portion thereof and terminating in an upper rounded end, and spaced ribs extending from the top of said stem vertically downward and outwardly and upwardly across said dish-shaped member and having substantially semi-circular outer edges.

3. A dolly for a washing machine comprising a cup-shaped disk with a frusto-conical portion rising from its center having a substantially cylindrical stem projecting centrally thereabove and terminating in a rounded top, said stem having radial ribs projecting therefrom and extending along the sides thereof, said ribs being tapered throughout their length of said stem and extending in lobe-shaped form across the surface of said disk.

4. The structure set forth in claim 2 the lower portion of said semi-circular edges being substantially continuous with the surface of said dish-shaped member.

5. An agitating member for a washing machine comprising a cup-shaped disk having a frusto-conical portion rising from the center thereof, the vertical elements of which are concave so that the surface of said portion merges into the surface of said disk and a round upwardly tapering portion projecting above said frusto-conical portion and terminating in a rounded surface, and narrow radial wings projecting from said latter portion and extending along the sides thereof and across the surface of said disk and having rounded outer edges merging into the concave surface of said disk.

6. A dolly for a washing machine comprising an annular trough a stem rising centrally from said trough and having a plurality of circumferentially spaced radial wings projecting therefrom and extending along its sides and across the surface of said trough the top surface of said wings above said trough curving downwardly and inwardly.

7. A dolly for a washing machine comprising a dish-shaped member and a rounded stem rising from and merging into the central portion thereof and terminating in an upper rounded end, spaced ribs extending vertically along said stem and merging

into the upper rounded end thereof and extending across the dish-shaped member at the lower ends in lobe-shaped form whereby the upper surfaces thereof above said member are concave.

8. A dolly for a washing machine adapted to be disposed in a liquid containing receptacle with its top portion well below the top of said receptacle comprising a circular disk-like member having a stem rising from and merging into its central portion, and ribs extending vertically from the upper end of said stem downwardly therealong and across the surface of said disk-like member.

9. A rotatable dolly for a washing machine adapted to be disposed in a liquid containing receptacle comprising a dish-shaped member having a central upstanding tapered stem with a rounded upper end, ribs extending across said dish and upwardly along the side of said stem and having rounded upper edges merging into the rounded surface of said stem.

In testimony whereof I affix my signature

CORNELIUS C. UNRUH.

H. F. SNYDER.

GEARING.

APPLICATION FILED MAR. 11, 1915.

1,209,893.

Patented Dec. 26, 1916.

2 SHEETS—SHEET 1.

Fig. 1

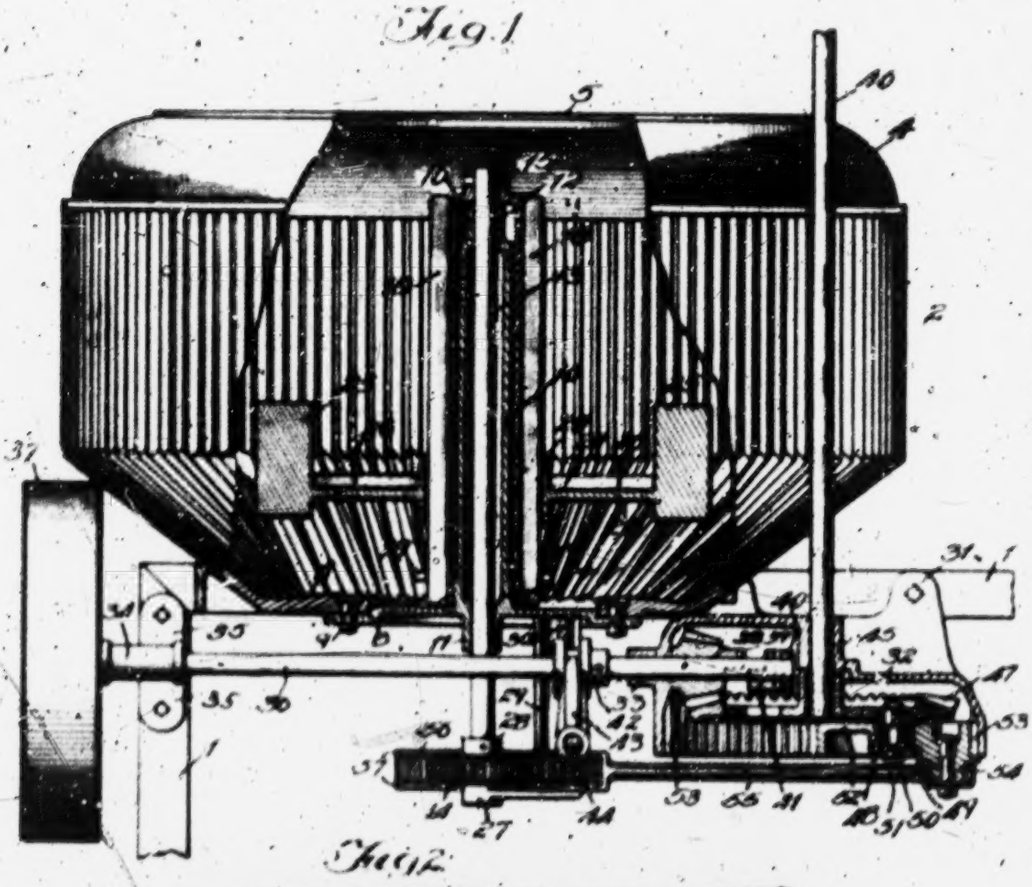
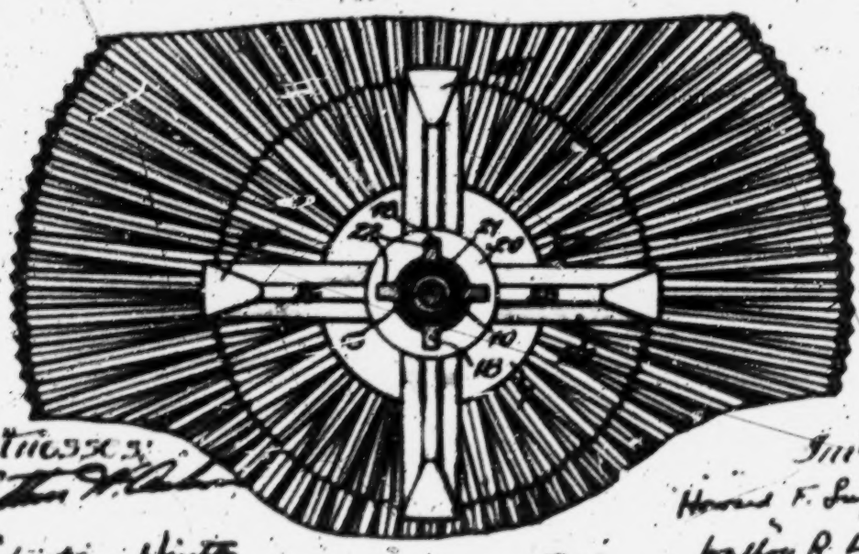


Fig. 2



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1035

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GEARING.

APPLICATION FILED MAR. 11, 1915.

1,209,893.

Patented Dec. 26, 1916.

2 SHEETS—SHEET 2.

Fig. 3

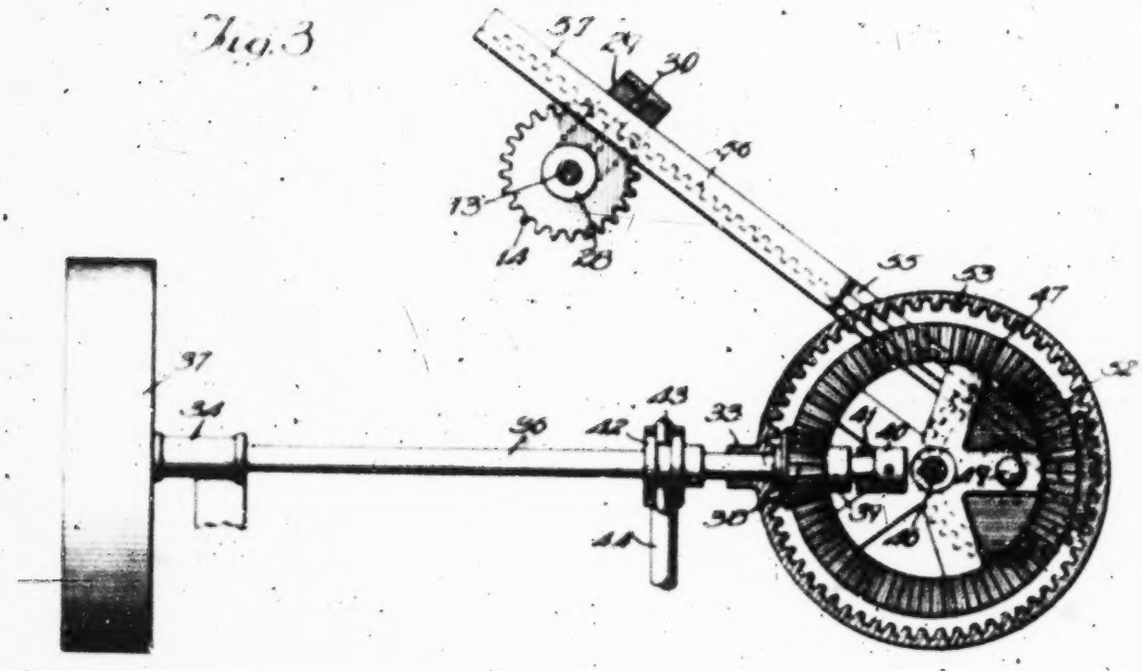
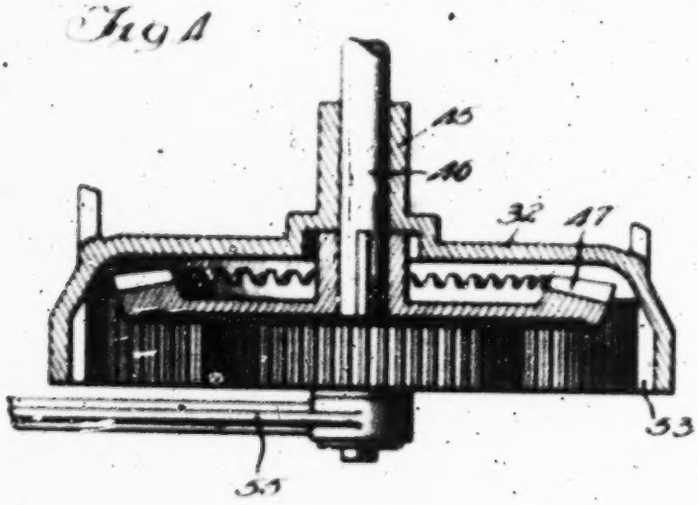


Fig. 4



Witnesses:

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10336

UNITED STATES PATENT OFFICE.

HOWARD F. SNYDER, OF NEWTON, IOWA, ASSIGNOR TO THE MAYTAG COMPANY, OF NEWTON, IOWA, A CORPORATION OF IOWA.

GEARING.

1,209,893. Specification of Letters Patent. Patented Dec. 26, 1916.

Application filed March 11, 1915. Serial No. 13,560.

To all whom it may concern:

Be it known that I, HOWARD F. SNYDER, a citizen of the United States, residing at Newton, in the county of Jasper and State of Iowa, have invented certain new and useful Improvements in Gearing, of which the following is the specification.

This invention relates to washing machines and gearing therefor, and particularly to dolly construction and dolly operating mechanism for such machines.

It is an object of this invention to provide a dolly which acts upon the clothes from below instead of from above, whereby the action of the dolly will not be affected by the amount of clothes in the tub, and a very few clothes may be washed as perfectly as the ordinary full charge for the machine.

It is another object of this invention to provide a gearing mechanism for driving the dolly of a washing machine in which said dolly will be given a continuous periodic rotary movement in addition to its oscillations, so that the clothes in the tub in addition to being swished back and forth will be also continuously periodically rotated, or revolved back and forth so as to assume different positions about the tub as they are being swished back and forth therein.

Further objects and advantages of the invention will appear as the description to follow proceeds.

In the drawings, Figure 1 is an elevation partly in section of the washing machine constructed according to my invention. Fig. 2 is a sectional plan view of a portion thereof. Fig. 3 is a sectional plan view upon another plan of the operating mechanism for the dolly. Fig. 4 is a sectional elevation of a portion of said gearing.

In the drawings 1 refers to the frame or bench of a washing machine, preferably made up of metallic angle bars. 2 represents the tub mounted in said frame or bench. The tub 2 it is to be particularly noted is of peculiar and novel form and includes a tapered bottom 3 and a dome 4 and lid 5. It is preferably cast in one piece save for the lid, and from aluminum. The bottom 6 of the tub is provided with a central aperture 7 which is closed by the circular plate 8, fastened therein by means of bolts such as 9. Preferably cast integral with the plate 8 is the upstanding sleeve 10 having bearings 11 and 12 at its upper and lower ends in which is mounted the vertical dolly operating shaft 13 having upon its lower end a pinion 14 by which it is driven by mechanism and in a manner now to be described.

Secured to the top of the shaft 13, as for instance by the pin 15, is the sleeve 16 which overlaps the sleeve 10 and is snugly fitted thereabout on the integral collar 17 at the bottom of the sleeve 10 whereby wabbling of the sleeve 16 is prevented. The sleeve 16 is provided with a number (in this instance four) of blades 18 and adjacent its bottom is provided with outstanding pins or rests 19.

The dolly proper is of a novel form comprising an elongated central hub 20 having a central aperture 21 and slots 22 so as to be slidable up and down upon the sleeve 16 and to be engaged with the blades 18 thereof to prevent rotative displacement with respect thereto. Projecting radially from the hub 20 are the arms 23 which are rounded on their upper surfaces, as shown at 24, and are provided at their outer ends with the washing blades 25 which project a considerable distance upwardly from the arms 23 and downwardly to the level of the bottom of the hub 20. Spanning the hub 20 and the blades 25 are the webs 26 which assist in the stirring action of the dolly in an obvious manner.

In operation the dolly is placed upon the sleeve 16, and slides down thereon until the bottom of the collar 20 rests upon the pins 19 after which the water and clothes may be placed in the tub and the machine operated in the ordinary fashion, the washing blades 25 gripping the clothes to carry them back and forth in the tub and rubbing them against the corrugated sides thereof, and the webs 26 assisting in the stirring action. By this means the clothes are operated upon from below and it is immaterial how full a charge is put into the machine, the operation upon the clothes being the same no matter whether few or many are being washed at one time. Moreover, the tapered bottom of the tub cooperates with the new form of dolly so as to cause the clothes at all times to come into operative engagement therewith.

I will now describe the gearing for driving the new dolly.

The pinion 14 on the bottom of the shaft 13 is interposed between the bearings 27 and the collar 28, the bearings 27 being integral with the bracket 29 which has thereon the upstanding web 30 which is rounded at its outer end. The bracket 29 is preferably formed integrally with the plate 8 which closes the bottom of the tub.

Secured to the frame 1 of the machine by lugs or ears, such as 31, is a depending housing 32 provided with a horizontal bearing 33 in alinement with the bearing 34, secured to the frame 1 by ears or lugs such as 35. Mounted in the bearings 33 and 34 is the driving shaft 36 provided at its end with the driving belt wheel 37. Keyed to the shaft 36 adjacent its inner end is the beveled pinion 38 having projecting therefrom the clutch tooth 39. Pinned to the end of the shaft is the clutch element 40 having a tooth 41 for engagement with the clutch tooth 39. The shaft 36 is provided with a collar 42 in engagement with which is a fork 43 upon the rock shaft 44. By this means the shaft 36 may be shifted longitudinally to engage or disengage the driving connection with the pinion 38 in an obvious manner. Mounted in a vertical bearing 45 in the housing 32 is the shaft 46 which is preferably connected with the wringer. Secured to the shaft 46 at its lower end is the beveled crown gear 47 in mesh with the pinion 38 whereby the pinion 38 when in driving connection with the pulley 37 drives the gear 47. Upon the lower face of the gear 47 is secured a journal 48 by means of the bolt 49, washer 50 and nut 51. Revolubly mounted upon the journal 48 is the gear 52 in mesh with the internal gear 53 which forms a depending extension of the housing 32. It is to be noted that the pitch circle of the gear 52 does not intersect the axis of the gear 53. Therefore the gear 52 does not occupy the same relative position during successive revolutions of the gear 47. In other words, the planetary pinion contains a number of teeth unequal to one-half of the total number of teeth in the internal gear, and therefore the action is not cyclic but a traverse is caused because the axis of the gear 52 will occupy different positions upon successive revolutions of the gear 47. The gear 52 has seated therein and secured thereto the journal 54 which projects downwardly below the plane of the internal gear 53 and forms a crank pin for the pitman 55 which, at its other end, terminates in the rack 56 in engagement with the pinion 14. The rack 56 is provided with inwardly projecting flanges 57 at its top and bottom which embrace the pinion 14 and keep the rack 57 in proper alinement therewith. The back of the rack 57 is in more or less loose contact with the rounded edge of the web 30 hereinabove described, whereby the rack 57 may pivot on the web 30 being kept at all times in engagement with the pinion 14 thereby.

In operation and assuming that the rock shaft 44 is rocked to the left from the position shown in Fig. 1 so as to engage the pinion 38, the rotation of the driving shaft will continuously drive the beveled crown gear 47. This will cause the gear 52 to be trailed around inside the internal gear 53 and thus both revolve with the gear 47 and rotate on the journal 48 on account of its engagement with the internal gear 53. The rotation of the gear 52 upon its own axis will, by means of the pitman connection, cause the rack 56 to be reciprocated correspondingly oscillating the shaft 13 and therefore the dolly in the washing machine. Superposed upon this motion, however, is the revolution of the gear 52 as it is carried around by means of the crown gear 47. This latter movement will obviously cause the pitman 55 to move backward and forward periodically while it is reciprocating and will thus cause a periodic backward and forward rotation of the pinion 14 and therefore of the dolly, in addition to the oscillatory movement of these parts. In short on each oscillation the dolly will move farther in one direction than in the other so that the clothes in the tub will be periodically rotated back and forth in addition to being swished back and forth through the water by the oscillation of the dolly. By this means all of the clothes in the tub will receive equal action from the machine irrespective of their position therein, and the action of the machine upon the clothes will be augmented and its effect increased.

Having now described my invention I claim:

1. A gearing for washing machines comprising a driving shaft, a driven gear, a pinion on said driven gear, an internal gear with which said pinion meshes and an operating member connected to said pinion, the pitch circle of said pinion not intersecting the axis of the internal gear, whereby said pinion does not keep the same relative position during successive revolutions of the gear.

2. A gearing for washing machines comprising a driving shaft, a driven gear, a pinion on said driven gear, an internal gear having a number of teeth unequal to twice the number of teeth in the pinion with which said pinion meshes and an operating member connected to said pinion, and a clutch for operatively connecting and disconnecting said shaft and said driven gear.

3. In a gearing for washing machines a shaft, a vertically arranged reciprocating operating member, gear connections between

d shaft and said vertically arranged re-
rocating operating member including
ans to cause the traverse of said operat-
g member in addition to its normal oper-
ng motion.

In a gearing for washing machines, an
illatory shaft having a pinion thereon, a
k bar in mesh with said pinion, means to
aprocate said rack bar including means
cause different regions of said bar to en-
ge said pinion during different recipro-
ions of said bar.

In a gearing for washing machines, an
illatory shaft, a rotary shaft, connections
ween said rotary shaft and said oscilla-
y shaft including means whereby a peri-
ic oscillatory movement is given to said
ft in addition to the successive oscilla-
ns thereof.

In a gearing for washing machines, a
ft having a pinion thereon, a gear in
sh with said pinion, another gear car-
d by said first gear, an internal gear in
sh with said second gear and having a
mber of teeth unequal to twice the num-
ber of teeth thereon and a pitman connected to said second gear.

7. In a gearing for washing machines, a shaft having a pinion thereon, a gear in mesh with said pinion, another gear carried by said first gear, an internal gear in mesh with said second gear, a pitman, and a shaft adapted to be operated by said pitman, the pitch circle of said pinion not intersecting the axis of said internal gear.

8. In a gearing for washing machines, a shaft having a pinion thereon, a gear in mesh with said pinion, another gear carried by said first gear, an internal gear in mesh with said second gear and having a non-cyclic relation thereto, a pitman and a clutch for connecting and disconnecting said pinion and gears.

In witness whereof, I hereunto subscribe my name to this specification in the presence of two witnesses.

HOWARD F. SNYDER.

Witnesses:
A. R. McKINLEY,
H. E. GALUSHA.

H. F. SNYDER.

WASHING MACHINE.

APPLICATION FILED DEC. 18, 1916

1,391,214.

Patented Sept. 20, 1921.

Fig 1.

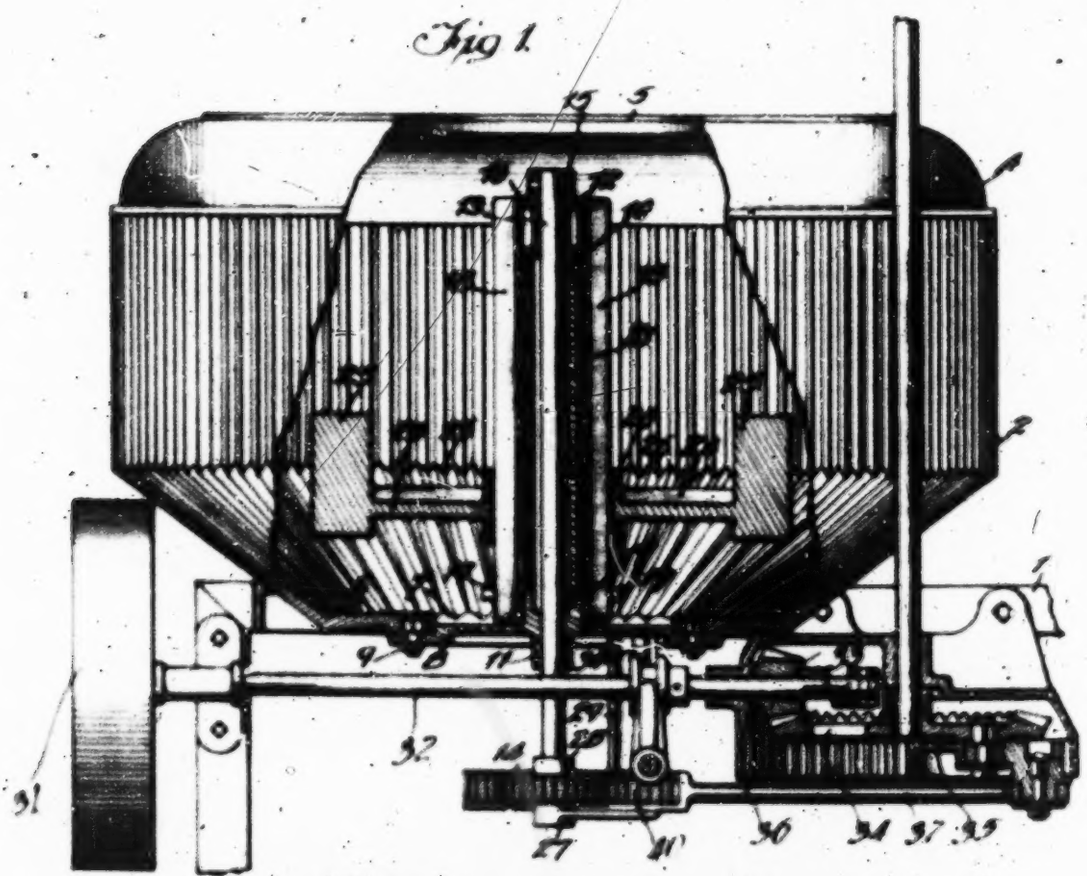
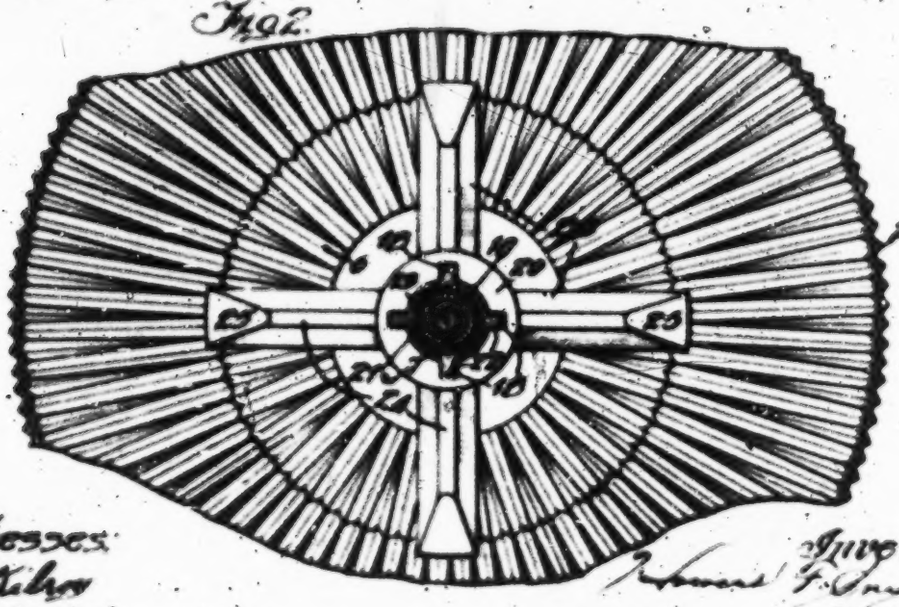


Fig 2.



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H. W. Wilcox

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Harvey F. Snyder
By William R. Lane
Atty

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UNITED STATES PATENT OFFICE.

HOWARD F. SNYDER, OF NEWTON, IOWA, ASSIGNOR TO THE MAYTAG COMPANY, OF NEWTON, IOWA, A CORPORATION OF IOWA.

WASHING-MACHINE.

1,391,214. Specification of Letters Patent. Patented Sept. 20, 1921.

Original application filed March 11, 1915, Serial No. 13,560. Divided and this application filed December 18, 1916. Serial No. 137,328.

To all whom it may concern:

Be it known that I, HOWARD F. SNYDER, a citizen of the United States, residing at Newton, in the county of Jasper and State of Iowa, have invented certain new and useful Improvements in Washing-Machines, of which the following is the specification.

This invention relates to washing machines and gearing therefor, and particularly to dolly construction and dolly operating mechanism for such machines.

It is an object of this invention to provide a dolly which acts upon the clothes from below instead of from above, whereby the action of the dolly will not be affected by the amount of clothes in the tub, and a very few clothes may be washed as perfectly as the ordinary full charge for the machine.

This application is a division of my application, Serial Number 13,560, filed March 11, 1915.

In the drawings, Figure 1 is an elevation partly in section of the washing machine constructed according to my invention.

Fig. 2 is a sectional plan view of a portion thereof.

In the drawings, 1 refers to the frame or bench of a washing machine, preferably made up of metallic angle bars. 2 represents the tub mounted in said frame or bench. The tub 2, it is to be particularly noted, is of peculiar and novel form and includes a tapered bottom 3 and a dome 4 and lid 5. It is preferably cast in one piece save for the lid, and from aluminum. The bottom 6 of the tub is provided with a central aperture 7, which is closed by the circular plate 8, fastened therein by means of bolts such as 9. Preferably cast integral with the plate 8, is the upstanding sleeve 10 having bearings 11 and 12 at its upper and lower ends in which is mounted the vertical dolly operating shaft 13 having upon its lower end a pinion 14 by which it is driven by mechanism and in a manner now to be described.

Secured to the top of the shaft 13, as for instance by the pin 15, is the sleeve 16 which overlaps the sleeve 10 and is snugly fitted thereabout on the integral collar 17 at the bottom of the sleeve 10 whereby wabbling of the sleeve 16 is prevented. The sleeve 16 is provided with a number (in this instance four) of blades 18 and adjacent its bottom is provided with outstanding pins or rests 19.

The dolly proper is of a novel form comprising an elongated central hub 20 having a central aperture 21 and slots 22 so as to be slidable up and down upon the sleeve 16 and to be engaged with the blades 18 thereof to prevent rotative displacement with respect thereto. Projecting radially from the hub 20 are the arms 23 which are rounded on their upper surfaces, as shown at 24, and are provided at their outer ends with the washing blades 25 which project a considerable distance upwardly from the arms 23 and downwardly to the level of the bottom of the hub 20. The sides and bottom of the tub are provided with the corrugations 26 which assist in the stirring action of the dolly in an obvious manner.

In operation the dolly is placed upon the sleeve 16 and slides down thereon until the bottom of the collar 20 rests upon the pins 19 after which the water and clothes may be placed in the tub and the machine operated in the ordinary fashion, the washing blades 25 gripping the clothes to carry them back and forth in the tub and rubbing them against the corrugated sides thereof, and the corrugations 26 assisting in the stirring action. By this means the clothes are operated upon from below and it is immaterial how full a charge is put into the machine, the operation upon the clothes being the same no matter whether few or many are being washed at one time. Moreover, the tapered bottom of the tub coöperates with the new form of dolly so as to cause the clothes at all times to come into operative engagement therewith.

The pinion 14 on the bottom of the shaft 13 is interposed between the bearing 27 and the collar 28, the bearing 27 being integral with the bracket 29 which has thereon the upstanding web 30 which is rounded at its outer end. The bracket 29 is preferably formed integrally with the plate 8, which closes the bottom of the tub.

The mechanism for driving the pinion 14 comprises a wheel 31 which operates through a shaft 32 to drive the beveled pinion 33, which drives the beveled gear 34, which carries a small pinion 35, which is trailed around inside the crown gear 36, operating the link 37, which has a rack 40, to mesh with the pinion 14, all as more fully described in my co-pending application above referred to.

In operation, power communicated to the

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fly wheel 31 will cause the shaft 13 to oscillate operating the dolly so that the same will act upon the clothes from underneath, as above explained.

Having now described my invention, I claim:—

1. In a washing machine, a tub comprising a corrugated body having a downwardly tapered bottom, having a substantially flat portion at the bottom of said taper, said flat portion having an opening therein, a detachable closure for said opening, said closure having an integral sleeve extending upwardly into said tub, an oscillatory shaft journaled in said sleeve, a carrier secured to said shaft, a dolly slidably mounted on said carrier, said dolly having upwardly projecting blades, the diameter of said dolly being such as to project slightly over said tapered bottom, whereby to give the maximum rubbing effect on the clothes.

2. In a washing machine, a tub having a bottom provided with an enlarged opening, a removable closure for said opening, a sleeve integral with said closure and extending upwardly into the tub, an oscillatory shaft journaled in said sleeve, a carrier secured to said shaft and having a rotating fit with the bottom of said sleeve, and a dolly slidably mounted on said carrier and having upwardly extending clothes engaging members.

3. In a washing machine, a tub comprising a corrugated body having a downwardly tapered bottom, having a substantially flat portion at the bottom of said taper, a sleeve extending upwardly into said tub from said flat portion, an oscillatory shaft journaled in said sleeve, a carrier secured to said shaft, a dolly slidably mounted on said carrier, the diameter of said dolly being such as to project slightly over said tapered bottom, whereby to give the maximum rubbing effect on the clothes.

In witness whereof, I hereunto subscribe my name to this specification in the presence of two witnesses.

HOWARD F. SNYDER

Witnesses:
L. S. LYDAY,
GUY WOOTON.

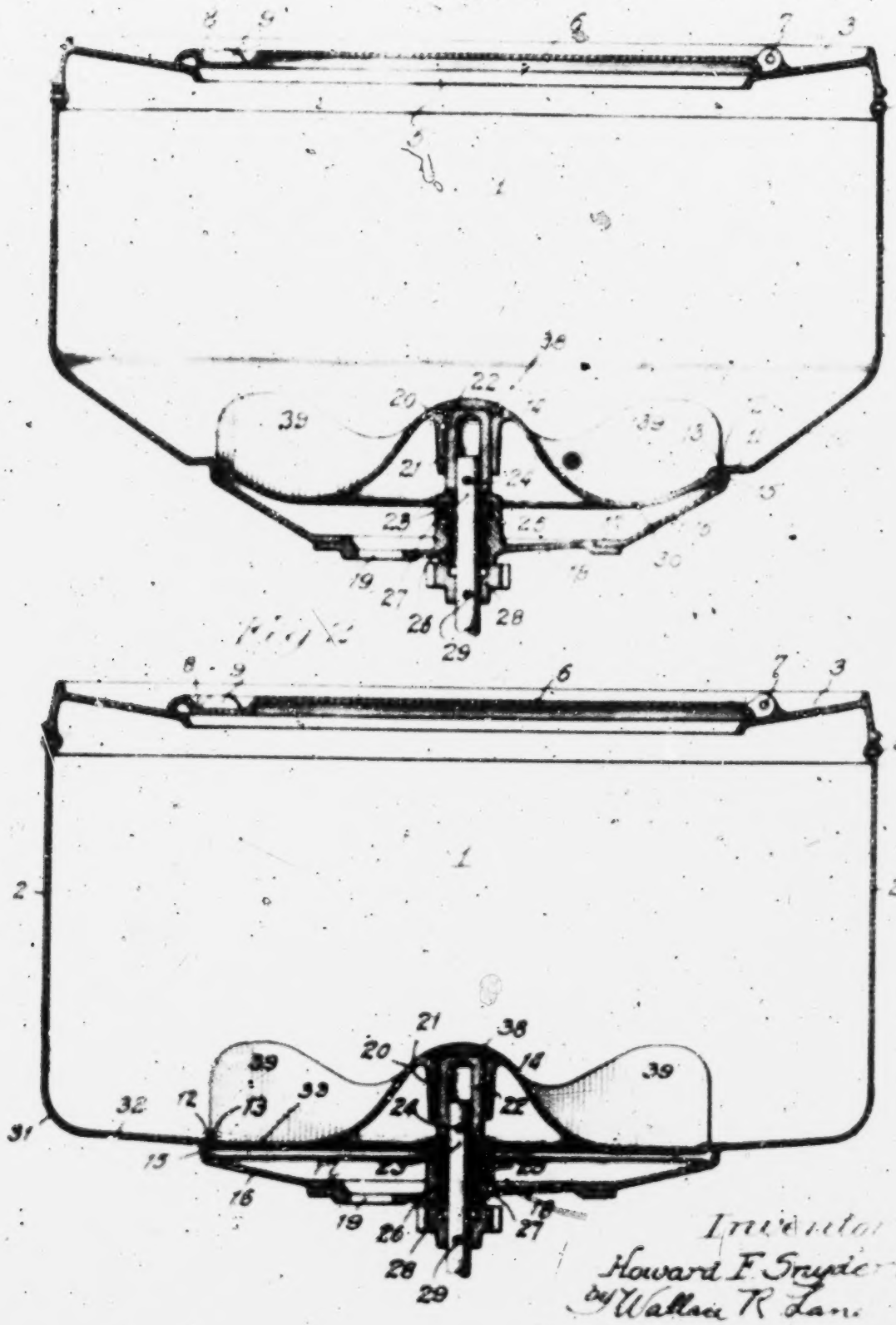
1042

Sept. 2, 1924. 1,506,783

H. F. SNYDER

WASHING MACHINE TUB

Filed Oct. 23, 1922



Inventor
Howard F. Snyder
by Wallace R. Lane

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1043.

Patented Sept. 2, 1924. 1,506,783

UNITED STATES PATENT OFFICE.

HOWARD F. SNYDER, OF NEWTON, IOWA, ASSIGNOR TO THE MAYTAG COMPANY, OF NEWTON, IOWA, A CORPORATION OF IOWA.

WASHING-MACHINE TUB.

Application filed October 23, 1923. Serial No. 669,378.

To all whom it may concern:

Be it known that I, HOWARD F. SNYDER, a citizen of the United States, residing at Newton, in the county of Jasper and State of Iowa, have invented certain new and useful Improvements in Washing-Machine Tubs, of which the following is a specification.

The present invention relates to washing machine tubs and has reference, more particularly, to the bottom portion of the tub and the surfaces of the gyratator, located near the lower portion of the tub, and the bottom of the tub.

Among the objects of the invention is to provide a construction so that the top surface of the gyratator and the top surface of the bottom of the tub will be even and form a substantially smooth continuous surface over which the materials to be washed may pass without catching upon the gyratator or the bottom of the tub and without causing any damage to the material; to so construct the device that the materials, such as clothing, lace curtains and delicate fabrics being washed, will be prevented from getting under the gyratator and clogging the operation of the same, or catching on any other part of the machine; and such further objects, advantages, and capabilities as will later more fully appear and are inherently possessed by the invention.

In the drawings illustrating two forms or embodiments of the invention;

Fig. 1 is a vertical sectional view of one form of washing machine tub constructed in accordance with the invention;

Fig. 2 is a similar view showing another form of the invention.

Referring more particularly to the drawings, the invention is shown as comprising a tub 1 which may be of any suitable shape, whether circular, square or other form and having vertical side walls 2, to the upper rim portion of which is attached a top member 3 by means of any suitable fastening members such as rivets 4. The top member 3 slants downwardly toward the middle of the top to an opening 5 which may be suitably closed by a cover or closing member 6, conveniently connected to the top member 3 by means of a hinge connection 7, as clearly shown in Figure 1 of the drawing. On the other side of the cover from that to which the hinge 7 is connected is formed a depression 8 in which is located a rigid or integral lug 9 adapted to be manually grasped for the purpose of opening and closing the cover 6, as desired.

At the lower portion of this tub, as shown in Fig. 1, is formed an inclined or oblique wall portion 10 extending downwardly to the bottom portion 11 which is preferably horizontal and has an inner margin 12 located closely adjacent to the outer margin 13 of a gyratator 14. From the inner margin 12 of the bottom 11 is a depending portion or flange 15 which connects with an inner inclined or oblique portion 16 leading to a flange 17 to which is connected, in any suitable manner, a drain plate 18, the drain plate 18 being formed with an inclined bottom extending to a drain opening 19, as clearly shown in Fig. 1 of the drawing.

The gyratator 14 is formed at its central portion with a conoidal central portion 20, having a depending socket member 21 fitting upon a sleeve 22 secured to a vertical shaft 23 by means of a cross pin 24. The shaft 23 extends downwardly through the drain plate 18, which is preferably provided with a packing box and bearing 25 extending upwardly from the drain plate 18 and around the shaft portion between the sleeve 22 and plate 18. Within the packing and bearing box 25 is suitable bearing material such as babbit 26 and packing materials 27 for preventing leakage of the washing liquid about the shaft as well as aiding in lubricating the shaft. To the lower portion of the shaft is secured a spur pinion 28 by means of a cross pin 29. This pinion is of utility to be connected with a suitable oscillating or alternately movable rack operated by the power mechanism of the washing machine. A suitable cap 38 may be provided to close the upper end of the gyratator or covering the upper end of sleeve 22.

The top wall of the gyratator extends downwardly from the central portion of the gyratator, then radially outwardly and then upwardly to its circular margin 13 which is located adjacent the margin 12 of the bottom 11 of the tub. The gyratator may also be provided with a plurality of radially extending vertical flanges 39 which are preferably formed integral with the remainder of the gyratator. Such gyratator is preferably formed of cast aluminum.

It will be noted that the outer margin

of the gyratator and the inner margin 12 of the bottom portion 11 of the tub, are located adjacent to each other and substantially upon the same level so that the lower curved portion 30 of the top of the gyratator will extend substantially in the same direction as the bottom of the tub and form therewith a substantially smooth continuous surface. In this way it will be observed that the materials being washed in the washing machine, and which are caused to pass radially from the center of the machine over the gyratator toward the side walls of the tub, will pass smoothly from the curved portion 20 over the margins 13 and 12 of the gyratator and tub respectively, and upwardly along or by the side wall portion 10 and the side wall 2 of the tub, without the materials being in any way damaged, or injured or becoming caught on any part of the tube or passing beneath the gyratator.

It will be noted that the lower inclined portion 16 of the tub, together with the drain plate 18, form a depression in the bottom of the tub in which the gyratator is operatively located so that the top surface of the gyratator will be even with the top surface of the bottom portion 11 of the tub.

In the tub as shown in Fig. 2 of the drawing, the construction is substantially the same as that described in Fig. 1, and all similar parts are designated by the same reference characters. Instead of having an inclined portion 10 and a narrow bottom portion 11, as shown in Fig. 1, the side wall 2 of the tub extends downwardly to a corner portion 31 extending inwardly to the horizontal or flat portion 32 of the tub, the portion 32 having the inner margin 12 located adjacent the outer margin 13 of the gyratator. It will also be noted that the depression of the bottom of the tub is more shallow than in the form shown in Fig. 1 of the drawing, and that the top surface of the gyratator has a more nearly flat portion 33 in lieu of the curved portion 30 of the form shown in Fig. 1 of the drawing. The portion 33 of the gyratator and the bottom 32 of the tub will form a substantially continuous flat surface, the inner margin of the gyratator and the outer margin of the tub being located adjacent to each other.

In the operation of the device the gyratator is preferably given an alternate rotary movement or oscillation, and the contents of the tub, including the washing materials, and the materials to be washed thereby, are acted upon in such a way that the materials will pass from the central portion of the tub over the gyratator toward the side walls of the tub and upwardly toward the upper portion of the tub, and then inwardly toward the middle portion of the tub and then downwardly toward the gyratator. During this movement it is highly important that none of the materials being washed, pass beneath the gyratator or become jammed or clogged in between the edge of the gyratator and the bottom portion of the tub, yet the washing material should have access to the draining portion of the tub in order that it, with the soil, may flow over the drain plate to the drain port 19. The drain port 19 may be closed by any suitable closing means or connected in any suitable manner to a hose connection or the like so that the drain water may be drained off as desired.

While I have herein described and shown upon the drawings two embodiments of the invention, it is to be understood that the invention is not limited to the specific construction, details and arrangements of parts shown and described, but that other constructions, details, and arrangements of parts are comprehended by the invention without departing from the spirit thereof.

The construction herein set forth is an improvement on that described and claimed in my prior pending application Serial No. 568,158, filed June 14, 1922.

Having now described my invention, I claim:—

1. In a washing machine, a tub having a bottom, a gyratator operable near said bottom, the top surfaces of said gyratator and said bottom forming a smooth substantially continuous surface.

2. In a washing machine, a tub having a flat bottom, a gyratator operable near said bottom, the top surfaces of said gyratator and said flat bottom forming a smooth substantially continuous surface.

3. In a washing machine, a tub having a bottom provided with a depression in said bottom, a gyratator operable in said depression, the top surfaces of said gyratator and said bottom forming a smooth substantially continuous surface.

4. A washing machine, a tub having a bottom provided with a circular depression therein, a circular gyratator operable in said depression, the upper surfaces of the adjacent portions of said gyratator and said bottom forming a smooth substantially continuous surface.

5. In a washing machine, a tub having a bottom provided with a depression therein, a gyratator operable in said depressions, the outer margin of said gyratator and the inner margin of said bottom being located adjacent to each other whereby the materials being washed pass smoothly from the upper surface of the gyratator to the upper surface of the bottom.

6. In a washing machine, a tub having a bottom provided with a circular depression therein, a circular gyratator operable in said depression, the outer margin of said gyratator and the inner margin of said tub bottom being adjacent to each other whereby the passage of the contents of the tub from the

top surface of the gyratator to the bottom will be smooth.

7. A washing machine tub comprising an alternately rotary gyratator, and a bottom portion having a depression therein, the gyratator being located in said depression and having a top surface extending to and forming a substantially smooth continuation with the relatively stationary bottom portion of the tub, whereby the materials being washed may pass smoothly from said gyratator to the bottom of the tub.

8. A washing machine tub comprising a bottom having relatively movable portions, the upper surfaces of said portions lying in substantially the same plane.

9. A washing machine tub comprising a bottom having relatively movable portions, the top surfaces of said portions forming a substantially continuous surface whereby the contents of the tub may pass smoothly thereover.

10. In a washing machine tub provided with a recess in a wall thereof, a substantially disc shaped agitator seated in said recess and adapted to be turned therein, the operative surface of said agitator being formed to engage the materials to be washed and forming substantially a continuation of the aforesaid wall of the tub.

11. In a washing machine tub provided with a recess in the bottom wall thereof, a substantially circular shaped agitator seated in said recess and adapted to be turned therein, the operative surface of the agitator being formed to engage the materials to be washed and forming substantially a continuation of the aforesaid wall of the tub.

12. In a washing machine tub provided with a recess in the bottom wall thereof, a substantially disc shaped agitator seated in the recess and adapted to be turned therein, the operative surface of the agitator being formed to engage the materials to be washed and forming substantially a continuation of the aforesaid wall of the tub.

13. In a washing machine tub provided with a downwardly sloping recess in the bottom wall thereof and upwardly extending bars projecting upwardly from the bottom of the tub into said recess, a shaft extending through said bar, a substantially disc shaped agitator seated in said recess and adapted to be turned by said shaft, the operative surface of the agitator being formed to engage the materials to be washed and extending for a substantial distance substantially parallel to the bottom of the said recess.

14. In a washing machine tub provided with a recess having an outer vertical wall, a substantially circular agitator seated in said recess and having a beaded edge adapted to lie closely adjacent to the upper edge of the aforesaid vertical wall, the upper surface of the agitator being formed with upstanding wings whereby when the agitator is turned the materials to be washed are agitated.

In witness whereof, I hereunto subscribe my name to this specification.

HOWARD F. SNYDER.

DISCLAIMER.

1,506,783.—*Howard F. Snyder*, Newton, Iowa. WASHING-MACHINE TUB. Patent dated September 2, 1924. Disclaimer filed October 6, 1928, by the assignee by mesne assignments, *The Maytag Company*.

Hereby enters this disclaimer to those claims of the specification of said Letters Patent which are as follows:

"10. In a washing machine tub provided with a recess in a wall thereof, a substantially disc shaped agitator seated in said recess and adapted to be turned therein, the operative surface of said agitator being formed to engage the materials to be washed and forming substantially a continuation of the aforesaid wall of the tub.

"11. In a washing machine tub provided with a recess in the bottom wall thereof, a substantially circular shaped agitator seated in said recess and adapted to be turned therein, the operative surface of the agitator being formed to engage the materials to be washed and forming substantially a continuation of the aforesaid wall of the tub.

"12. In a washing machine tub provided with a recess in the bottom wall thereof, a substantially disc shaped agitator seated in the recess and adapted to be turned therein, the operative surface of the agitator being formed to engage the materials to be washed and forming substantially a continuation of the aforesaid wall of the tub.

"13. In a washing machine tub provided with a downwardly sloping recess in the bottom wall thereof and upwardly extending bars projecting upwardly from the bottom of the tub into said recess, a shaft extending through said bar, a substantially disc shaped agitator seated in said recess and adapted to be turned by said shaft, the operative surface of the agitator being formed to engage the materials to be washed and extending for a substantial distance substantially parallel to the bottom of the said recess."

[*Official Gazette October 23, 1928.*]

Oct. 11, 1927. 1,644,959

H. F. SNYDER

WASHING MACHINE

Filed June 16, 1921 5 Sheets-Sheet 1

Fig. 1

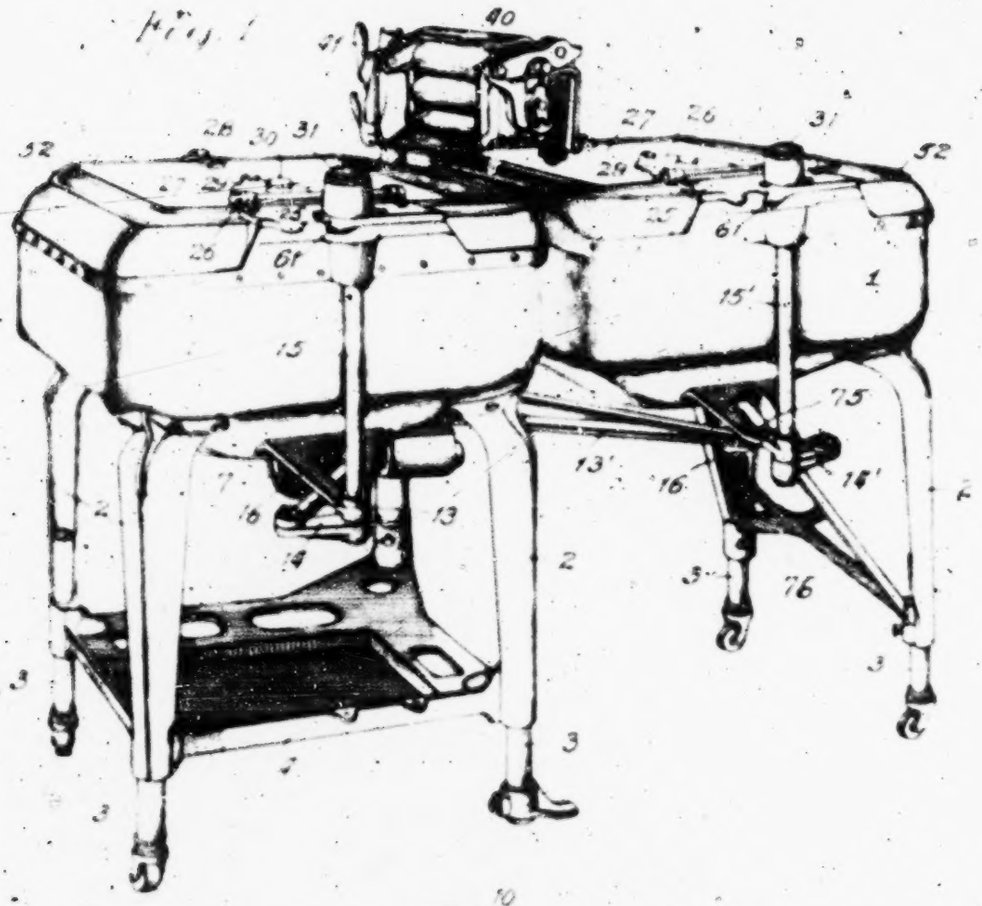
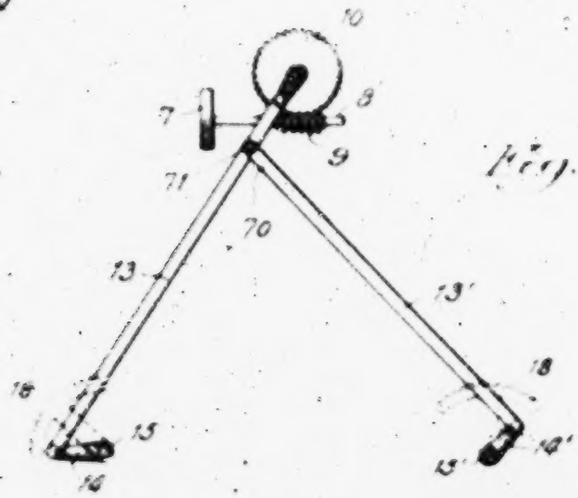


Fig. 8.



Witness
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1,644,959

WASHING MACHINE

Filed June 16, 1921

5 Sheets-Sheet 2

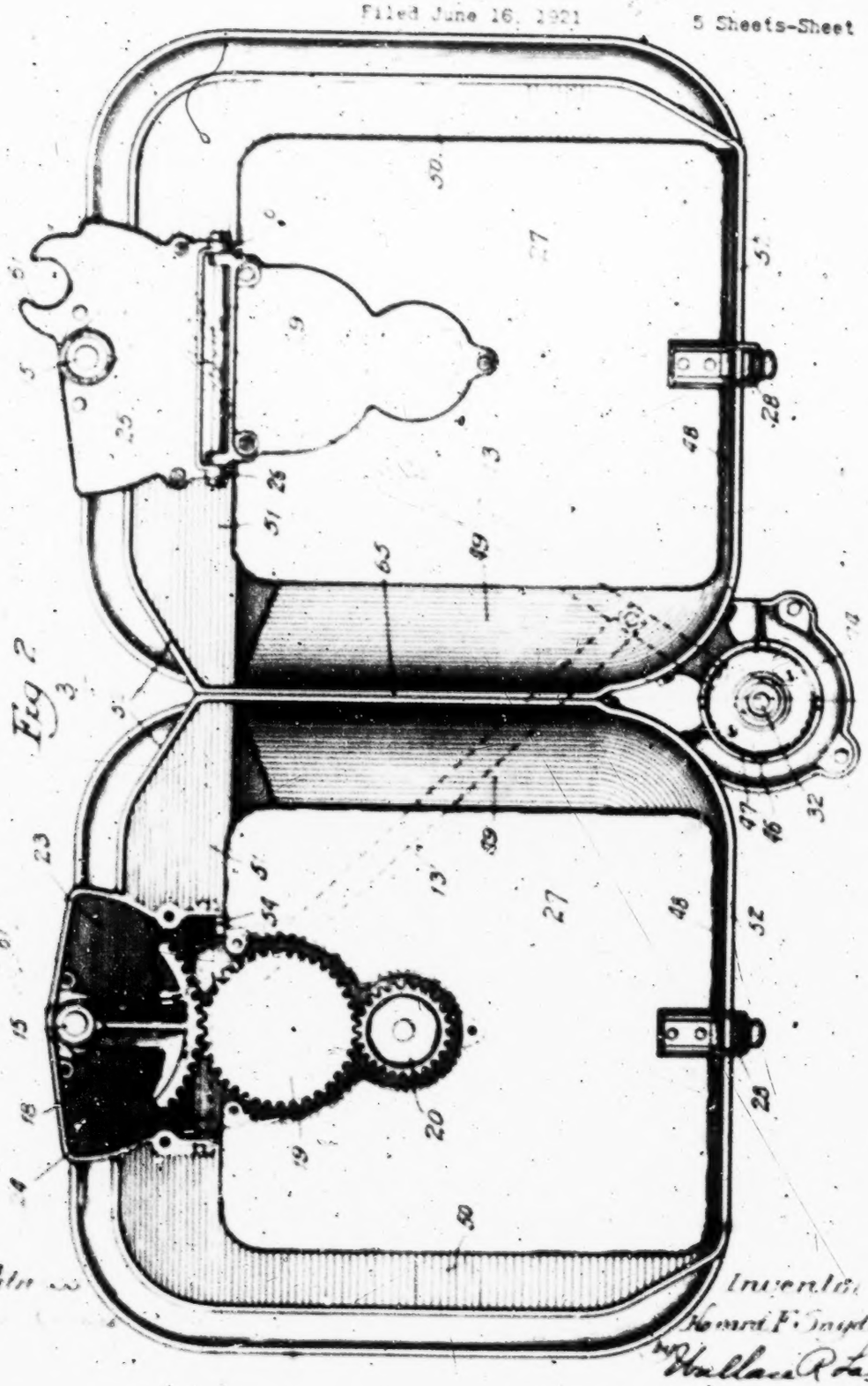

Fig 2

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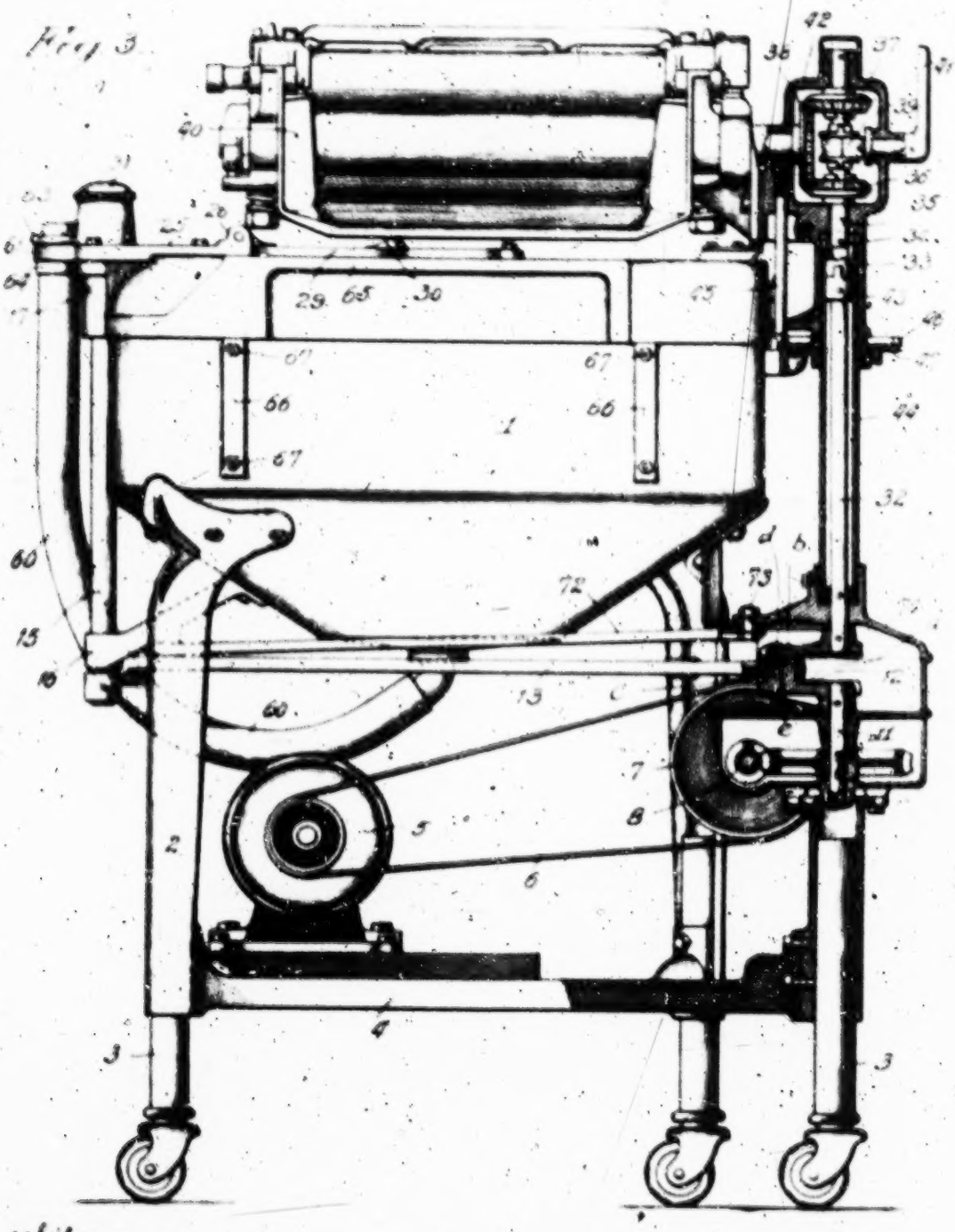
WASHING MACHINE

Filed June 19, [illegible] 5 Sheets-Sheet 3

Fig. 3.



Witness:
[illegible]

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WASHING MACHINE

Filed June 16, 1921

1,644,959

5 Sheets-Sheet 4

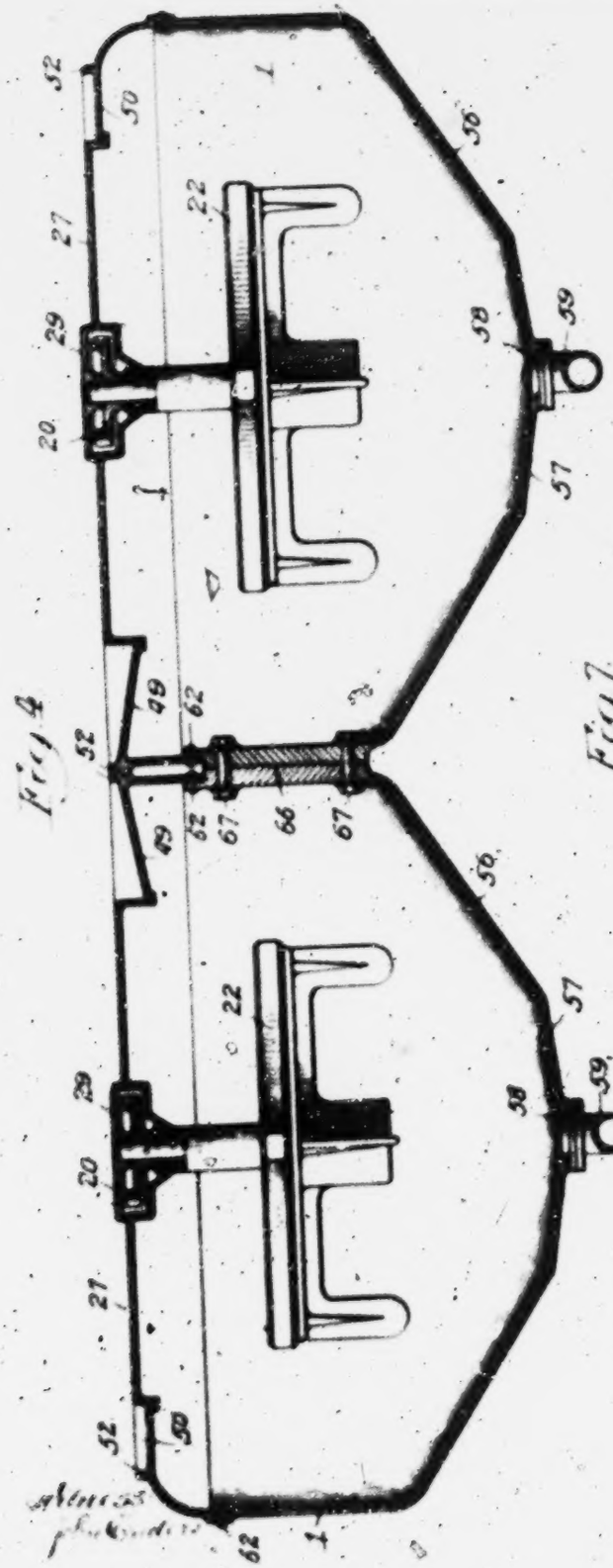

Fig 4

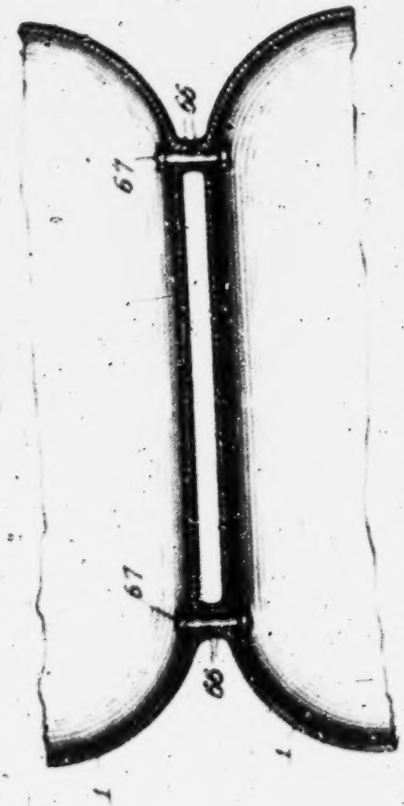

Fig 7

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WASHING MACHINE

Filed June 16, 1921 5 Sheets-Sheet 5

Fig. 5

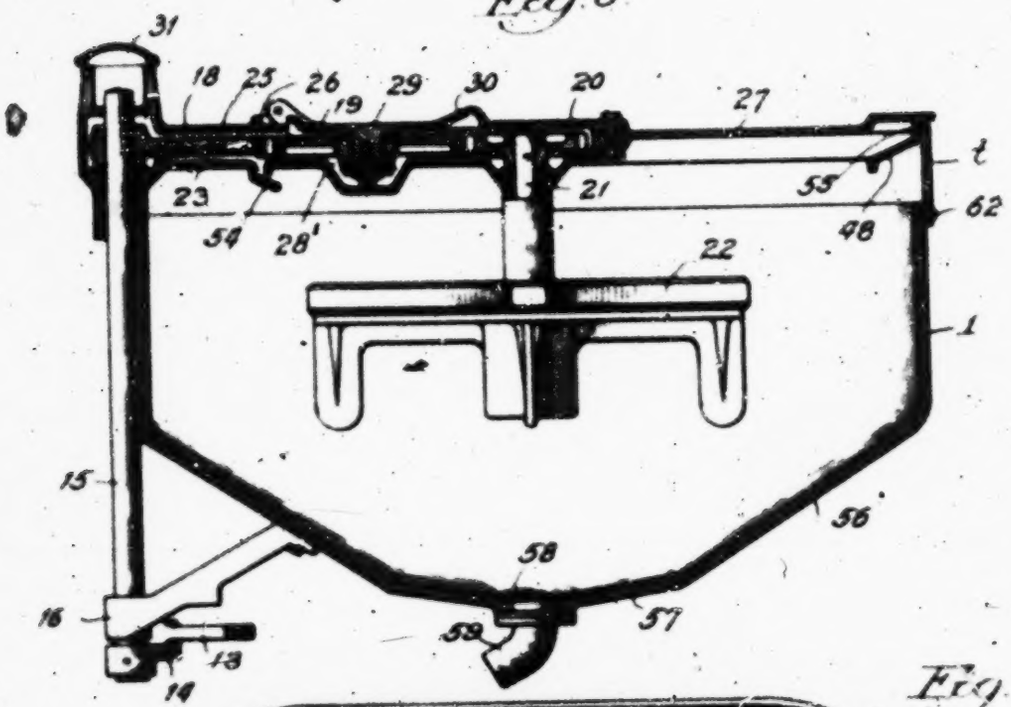
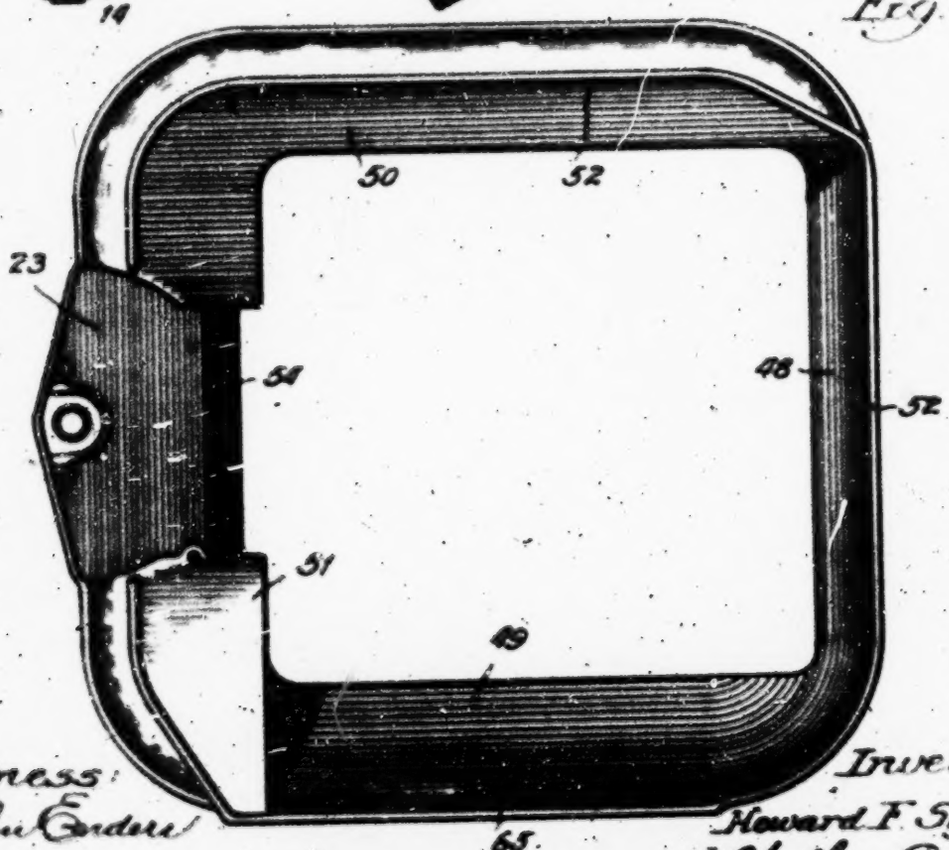


Fig. 6



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Inventor
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By Wallace & Lane
Atty.

Patented Oct. 11, 1927. 1,644,959

UNITED STATES PATENT OFFICE.

HOWARD F. SNYDER, OF NEWTON, IOWA, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE MAYTAG COMPANY, OF NEWTON, IOWA, A CORPORATION OF DELAWARE.

WASHING MACHINE.

Application filed June 16, 1921. Serial No. 477,888.

This invention relates to washing machines, and includes among other improvements such construction that either before or after a period of use a need for increased capacity can be met by merely securing an auxiliary washing machine, substantially similar in construction to the first machine (except to omit the motor and wringer), to be connected to the first machine for operation from the motor thereof, to enable both machines to work together as a unit.

Among the further objects of my invention is to provide for the attachment of an auxiliary washing machine to one already in use, in a quick, simple and efficient manner, both machines to be driven from the motor of the first machine by a simple and quickly effected connection, and both served from a single swinging wringer; further to provide novel means for connecting together each plurality of machines; further to generally improve washing machine construction; further to so construct the top portion of the tub or tubs that spilled water will run back into the tub instead of on the floor; further to form the body portion of the tub of metal, preferably aluminum, and sloped toward the center to permit the easy attachment of a hose, or the like, to effect ready draining of the tub without tilting the same; further to provide washing machine tubs constructed with one or more flat sides in the upper portion; to so arrange the dolly driving mechanism in the top of the tub as to render the top thereof substantially unobstructed and practically flat; further to provide an improved washing machine tub formed of aluminum, which will not become water-soaked, rust, corrode, dry out, sliver or split; further to increase the capacity of clothes washing machines while occupying small floor space; further to render possible the washing of only a few pieces with little water, and permit removal of the water from the tub without tipping the tub; further to provide improved means for automatically throwing the washer out of gear when the lid is raised, and into gear when the lid is closed; further to provide a washing machine extremely easy to operate, and having the main working parts enclosed in oil tight cases, and to eliminate danger of accidents; further to provide a washing machine especially adapted for use with a swinging wringer, and a swinging wringer therefor; further to provide a washing machine constructed substantially entirely of metal, and one that can be easily cleaned, always sanitary, and light in weight; further to so combine a washing machine and swinging wringer that the latter can be removed by merely lifting it from the frame; further to produce a washing machine of maximum simplicity, efficiency and economy; and such further objects, advantages and capabilities as will later more fully appear.

My invention further resides in the combination, construction and arrangement of parts illustrated in the accompanying drawings, and while a preferred embodiment is shown therein, I desire the same to be understood as illustrative only, and not as limiting the scope of my invention.

In the drawings:—

Fig. 1 is a perspective view of a clothes washing apparatus embodying my invention.

Fig. 2 is a plan view of the arrangement shown in Fig. 1, but omitting the gear casing cap from the left hand machine, and with the wringer removed.

Fig. 3 is a sectional view on line 3—3 of Fig. 2, but showing the wringer in position, the main parts of the wringer being shown in elevation.

Fig. 4 is a vertical longitudinal section on a central vertical plane, taken through both tubs of Figs. 1 and 2.

Fig. 5 is a vertical section through one of the tubs on a plane at right angles to that of Fig. 4.

Fig. 6 is a plan view of the top of one of the tubs, with the cover and associated parts removed.

Fig. 7 is a fragmentary sectional detail, showing the manner of connection between the two tubs.

Fig. 8 is a detailed plan view of the operating parts beneath the tub.

Referring to the drawings, Fig. 3 shows the main or primary washing machine of my invention, in which the tub 1 is mounted upon the legs 2, having adjustable extensions 3 at their lower ends. Secured to and extending between the legs is platform 4 carrying any suitable form of motor 5, which is connected by belt 6 (or other suitable power transmitting means) to drive wheel or pulley 7, carried by shaft 8, which shaft as seen in Fig. 8 has fixed to rotate there-

with worm pinion 9, meshing with gear 10, mounted upon the lower end of vertical shaft 11. Fixed to the upper end of shaft 11 is crank arm 12, to which is pivotally connected the connecting rod 13, which at its opposite end is pivotally connected to a second crank arm 14, mounted at the lower end of vertical shaft 15, which as shown in Fig. 3 is journalled in suitable brackets 16 and 17. Fixed to the upper end of shaft 15 (see Figs. 2 and 5) is segmental rack 18, meshing with horizontal gear 19, which in turn has driving engagement with pinion 20, fixed to the upper end of dolly shaft 21, which shaft extends downwardly into the tub and carries the agitating or dolly member 22. As seen in Figs. 2 and 5, the segmental rack 18, gear 19 and pinion 20, are seated within depressions or casings, by reason of which the top of the tub is substantially flat and free of projections. Surrounding depression 23, within which segmental rack 18 is seated, is an upstanding rib 24, and covering this depression is a cover plate 25, formed with ears 26, to which is hinged the cover 27 of the tub, the cover having any suitable securing means 28, for locking same in closed position. It will also be seen in Fig. 5 that the cover 27 is formed with an elongated depression 28', receiving gear 19 and pinion 20, and which depression is covered by plate 29, suitably secured by bolts, or the like, to cover 27. This arrangement is such that the dolly driving means at the top of the tub are mounted in the oil tight casings in a substanially flat manner. Formed in cover plate 29, is an angular and slightly upstanding portion 30, which contacts with cap 31, to support the cover in open position.

Extending upwardly in vertical alignment with shaft 11 (see Fig. 3) is shaft 32, having a clutch connection 33, at its upper end to receive sleeve 34 of shaft 35, which through the medium of bevelled gears 36, 37 and 38, drives the rolls of wringer 40. Longitudinally slidable on shaft 35, between gears 36 and 37 is clutch member 39, provided at its opposite ends with clutch surfaces, to respectively engage cooperating clutch surfaces on the inner faces of bevel gears 36 and 37, whereby when clutch 39 is moved longitudinally of shaft 35, to which it is splined (which movement is effected by the handle 41), the wringer rolls, as will be readily understood, may be rotated in one direction, or the other. Downwardly extending from gear casing 42 of the wringer is the tubular portion 43, rotatable on column 44, surrounding shaft 32, by virtue of which the wringer may readily be swung into any desired horizontal position and secured in such position by entry of rod 45 into the appropriate notch 46 of outwardly extending collar 47, secured to column 44, and upon which collar is seated the lo end of sleeve 43. As will be readily se this construction is such as to enable wringer to be readily removed from its s port by merely raising the same vertic from column 44, and when desired repla through reverse operations.

As will be seen in Fig. 6, the two s 48 and 49 of the top of the tub adja which the wringer will be swung in two its positions are downwardly and inwa inclined to return any water coming in c tact therewith from the wringer into tub. The greater part of the remaining s bounding the opening in the tub top are as shown at 50 and 51, and the entire to the tub is substantially surrounded by upstanding flange 52, to assist in return any spilled water back into the tub, prevent the same from going on to the f It is also to be noted that the inner edg the botttom of depression 23 is downwa and inwardly inclined, as shown at 5 Figs. 5 and 6, which construction further sists in returning spilled water into the The under face of the marginal portio the tub lid 27 is formed with the depen flange 55, which as seen in Fig. 5 fits in of upstanding rib or flange 52 to effect a stantially water tight joint.

As seen in Fig. 5, the body portion of tub is sloped inwardly and downwardly shown at 56 and 57, and is provided a central and lowermost portion with an o ing 58, to which is suitably and in a w tight manner connected the outlet mem 59, to which member in turn is secure drain hose, or the like, 60, which when in draining position is at its free end pl between the projecting fingers 61 at the of the tub to be held therein while the is in operation, which as will be noted tions the outlet end of the drain hose a the water level, and prevents the passag any water through the drain hose. This struction, if desired, may take the place valve, thus rendering the drain hose alw ready for use by simply detaching it f supporting fingers 61, and the end of hose moved to a sewer, grating, bucket the like. As seen in Fig. 5, the top por of the tub is secured by rivets, bolts, or like, 62, to the bottom portion of the From Fig. 2, it will be noted that the d hose supporting fingers 61 are formed part of cover plate 25, and extend a s distance beyond the side of the tub. It be understood that the end of drain hos will be provided with suitable extension and 64, to insure that the end of the will be retained in position in fingers until its removal is desired.

The upper portion of the sides of t are substantially straight, and the viewed in Fig. 3 is of special formati

afford secure contact therewith of an adjacent tub to be secured to the first tub. This is effected by providing this side of the top portion, with upstanding and narrower portions 65, and the lower or main portion of the tub body with outstanding ribs 66, whose faces are in the same plane with the faces of portion 65. A similar construction is found in the auxiliary tub or extension to be attached to the first described tub, which connection is effected by the bolts, or the like, 67, extending through ribs 66. By this arrangement the tub of the auxiliary machine may be quickly and securely fastened along side of the first tub, and operated from the motor of the first machine in a manner now to be described. Assuming that the user has operated the tub above first described, and finds a need for greater capacity, he can secure a second machine without the motor or wringer, with the two legs on the side adjacent the first machine omitted (or such two legs may be removed) and quickly secure the second machine to the first machine as described above. To effect operation of the second machine from the motor of the first machine, all that is necessary is to connect the free end 70 of the coupling member connecting rod 13' of the second machine pivotally at 71, to connecting rod 13 of the first machine, which will result in the movement of connecting rod 13 being transmitted through connecting rod 13' to crank 14' of the second machine, and through a vertical shaft 15' similar to shaft 15 of the first machine, the rotary oscillatory motion of which will be transmitted to the dolly of the second machine, through mechanism similar to that already described above. With this arrangement, only a single motor (that of the first machine) is necessary, and both tubs will be served by the wringer of the first machine. If desired, additional bracing members 76 may be applied to the second machine. If desired, an additional brace member 72 may be secured at one end by a suitable bolt, or the like, 73, to the casing 74 of crank 12, and at its other end by a bolt, or the like, 75, to the bracket 16 of the second tub, thus giving additional stiffening means between the two tubs. It is also to be noted that when two machines are secured to operate together, the casters of the inside legs of the first machine may be omitted and the adjustable extension 3 may also either be omitted or adjusted either into or out of contact with the floor, as desired. Adjustment of extension 3 into firm contact with the floor, will furnish additional support for the central portions of the combined machines, if desired. While I have shown a conventional type of motor, it is to be understood that any suitable source of motive power may be used, without departing from the spirit of my invention.

Referring to Fig. 3, it is to be noted that crank 12 at the upper end of shaft 11 is of the following composite construction: This crank is formed of two cranks, the one crank arm *a* of which is fixed to the upper end of shaft 11, while the other crank arm *b* thereof is fixed to the lower end of shaft 32. Crank arm *a* carries the upstanding pin *c* for rotatably receiving the end of connecting rod 13. Pin *c* is formed at its upper end with a depression *d* for receiving projection *e*, depending from crank arm *b*. These interfitting parts causing there two crank arms to rotate together, and at the same time providing a flexible connection between shafts 11 and 32, which permits ready removal of these parts from casing 74, as well as assembling of the respective parts.

It is also of importance to note (see Figs. 2 and 8) that the crank arms 14 and 14', from which the respective dollies of the two machines are driven, are so positioned relative to each other, and connecting rod 13' so arranged that when the dolly driven from the crank arm 14 is passing through its dead center, the dolly driven from crank arm 14' will be rotating at maximum speed.

Having now described my invention, I claim:—

1. A convertible unit washing apparatus comprising a single unit washing machine, including a tub, supporting means therefor, a prime mover mounted on said supporting means, and an agitator in the tub, an auxiliary unit washing machine, including a tub, supporting means therefor and an agitator in the tub, means for detachably and rigidly connecting said units together to operate as a double machine when connected or to permit the operation of the single unit machine alone when detached, actuating connections from the prime mover of said single unit machine to the agitator thereof, and an inert, actuatable means connected to the agitator of said auxiliary machine, said inert means terminating in a coupling member, and means for permitting the detachable connection of said coupling member to the actuating connection of said single unit machine, whereby the agitators of said machines may be actuated simultaneously from said single prime mover when said units are connected or whereby said single unit machine may be operated alone when said machines are disconnected.

2. A washing apparatus comprising a single unit washing machine including a support, a tub thereon, an oscillatable dolly on said tub, a prime mover, a first crank operated thereby, a second crank operably connected to said dolly, a connecting rod pivotally connected to said first and second cranks, an auxiliary washing machine comprising a support, a tub, a dolly thereon, a third crank operatively connected to the dol-

ly of said auxiliary machine, a second connecting rod pivoted at one end to said third crank and having a detachable connection for operative attachment to said first connecting rod and means for detachably and rigidly connecting said single-unit and auxiliary washing machines.

3. In a washing machine, a tub, a lid thereon, a rotary reciprocal dolly carried by said lid, and means for reciprocating said dolly, said lid being depressed for forming recesses for including said means.

4. In a washing machine, a tub having a depression in the top thereof, an oscillatable horizontal gear mounted in said depression, and a cover hingedly mounted on said tub, said cover having a depression therein within which is mounted gear to be driven by said first mentioned gear for oscillating a dolly.

5. In a washing machine, a tub having a depressed portion at one side of its top, a segmental rack oscillatably mounted in said depression, a lid hingedly mounted on said tub and formed with a depression, a dolly shaft operating pinion in said depression, a gear between said rack and said pinion, said rack, gear and pinion being positioned in a horizontal plane, and the pitch line tangent between said rack and said gear being approximately parallel to the hinge line of the lid, whereby elevation of the lid will disengage said rack and said gear, and lowering of the lid will cause inter-meshing of said rack and gear.

6. In a washing machine, a tub having a lid hinged thereon, a depression in said lid, a dolly shaft depending from said lid, gearing in said depression for operating said dolly, and a cover plate over said depression and gearing.

In witness whereof, I hereunto subscribe my name to this specification.

HOWARD F. SNYDER.

1055

Jan. 31, 1928. 1,657,699

H. F. SNYDER

DRIVING MECHANISM

Filed Aug. 18, 1923. 2 Sheets-Sheet 1

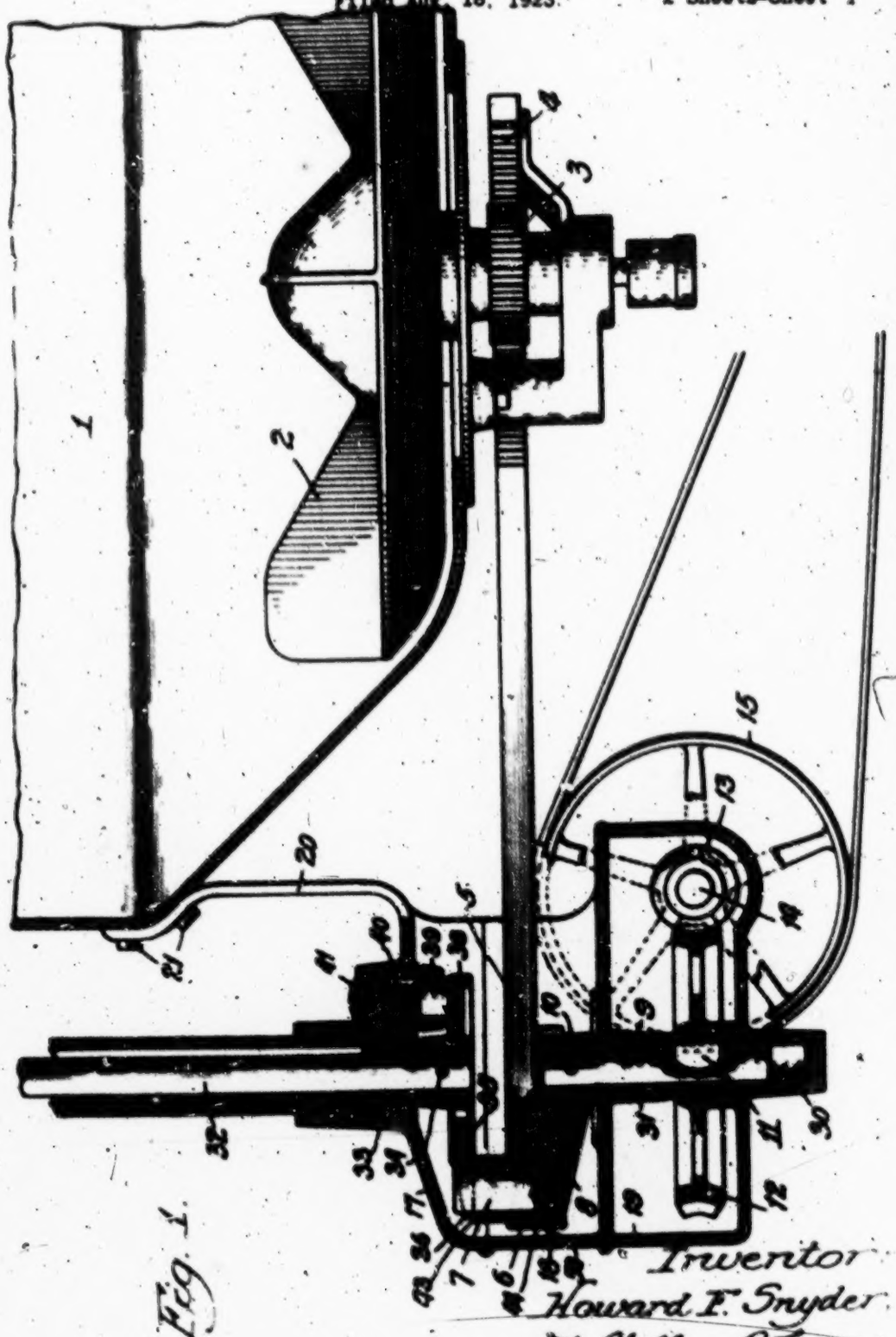

Fig. 1.

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Jan. 31, 1928. 1,657,699

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DRIVING MECHANISM

Filed Aug. 18, 1923 2 Sheets-Sheet 2

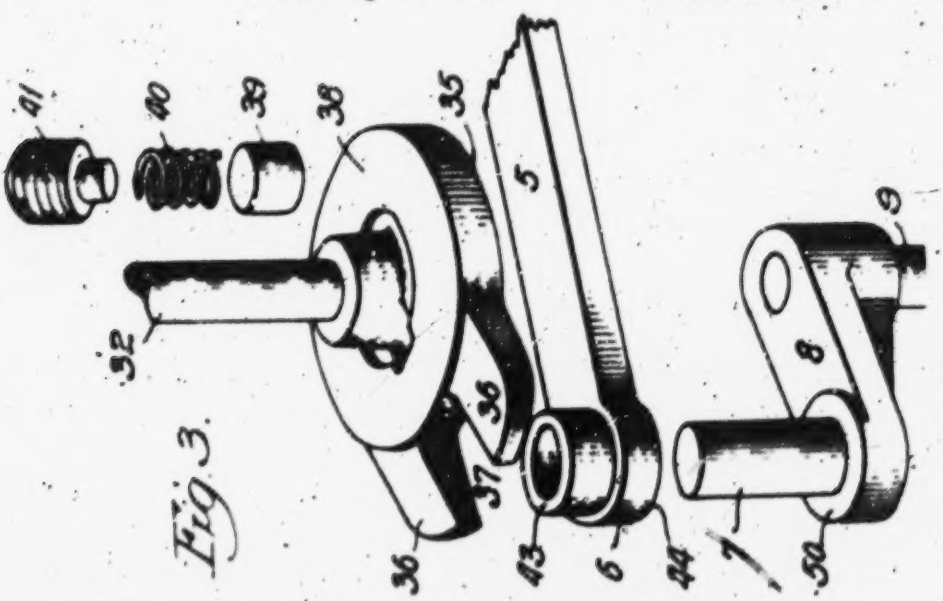
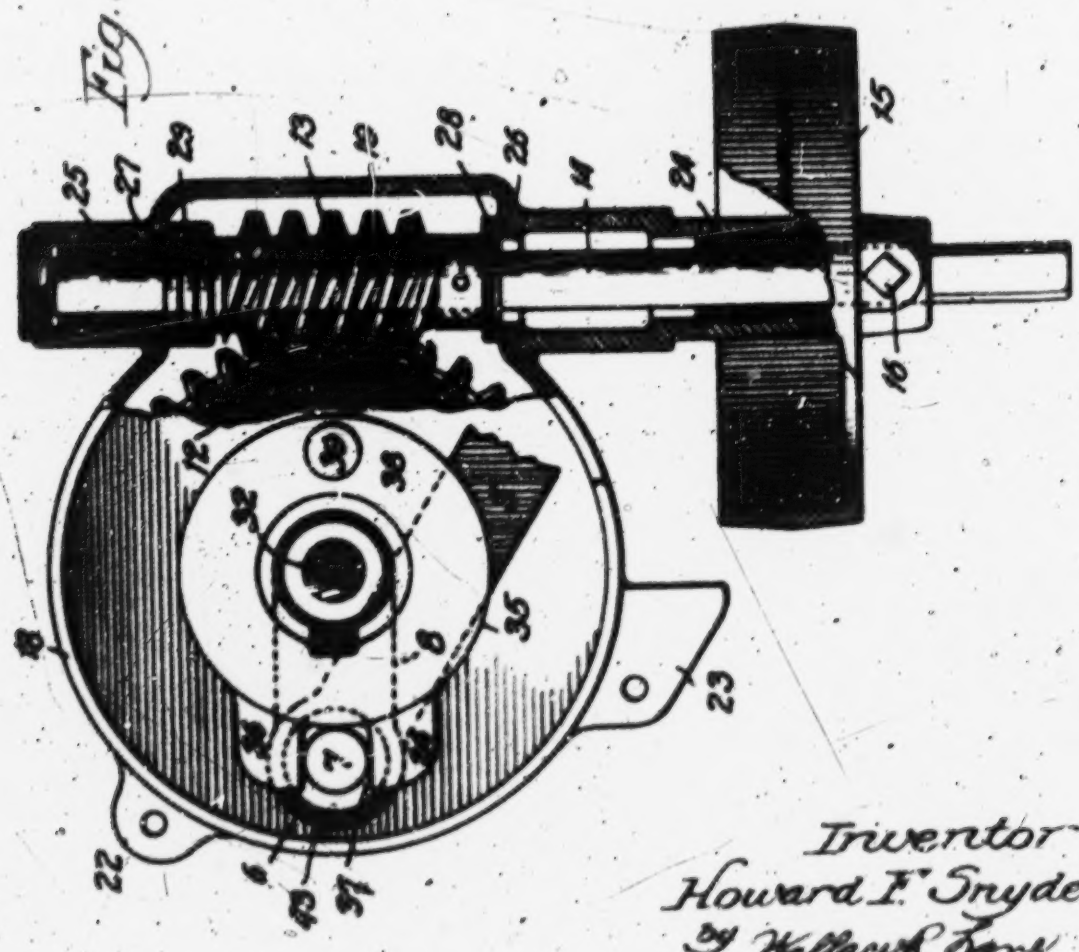


Fig. 3.

Fig. 2.



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Patented Jan. 31, 1928. 1,657,699

UNITED STATES PATENT OFFICE.

HOWARD F. SNYDER, OF NEWTON, IOWA, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE MAYTAG COMPANY, OF NEWTON, IOWA, A CORPORATION OF DELAWARE.

DRIVING MECHANISM.

Application filed August 18, 1923. Serial No. 658,076.

The present invention relates to driving mechanisms and has more particular reference to the type of driving device used in washing machines having alternately rotating agitator and wringer mechanism operated from a common driving source, it being understood that such machine is here referred to as merely illustrative of an adaptation or employment of the invention, of which there may be others without departing from the spirit of the invention.

Among the objects of the invention are to provide a driving mechanism of the kind disclosed with means for preventing or precluding chucking action or slapping of the parts of the mechanism which might ordinarily arise or occur from irregular operation of the driven apparatus or a change in the load imposed thereby upon the driving mechanism; with novel means for making reciprocatory operations of driven parts smooth without the annoyance of chucking or slapping noises as the reciprocated means alternates in motion; with novel means for precluding chucking or slapping action and the attendant annoying noises that might ordinarily arise from a change of load, as for example, the throwing off of a load, such as the wringer mechanism of a washing machine while the remainder of the machine continues to operate, and where the loaded parts continuing to be driven might overrun or tend to over-run to the extent of effecting such chucking action; with means for imposing a given normal load upon the mechanism so that when part of the operated device is thrown out of operation, such as when the wringer device is unclutched or stopped, the imposed load will still maintain the parts of the driving mechanism in driving engagement or relation whereby no back-lashing or slapping will occur or if any change in relation of parts does occur it will be gradual and wholly unnoticeable; and to provide for such other and further objects, advantages and capabilities as will later more fully appear and are inherently possessed by the invention.

In the drawings illustrating a preferred adaptation of the invention, Fig. 1 is a part sectional view through a washing machine tub and driving mechanism constructed in accordance with the invention; Fig. 2 is a view partly in top plan and partly in section of the driving mechanism; and Fig. 3 is a perspective view in separated assembly of certain details of the driving means.

Referring now more particularly to the drawings, one form of device selected to illustrate the invention is shown in connection with a washing machine having a tub 1 and the lower part of which is supported and an alternating reciprocatory liquid impelling member 2 extending downwardly through the bottom of the tub in any suitable manner and connected to a gear 3 with which is operatively meshed a rack 4 which is capable of reciprocation and giving the liquid impelling member an alternating rotary motion.

The outer end portion of pitman part 5 of the rack is formed with a bearing hub 6 bored to receive a crank pin 7 either forming an integral part or rigidly fastened to a crank arm 8 suitable secured to the upper end of a drive shaft 9 as by way of a cross pin 10, as clearly shown in Fig. 1 of the drawings.

To the lower end portion of the shaft 9 is suitably keyed, as by a Woodruff key 11, a worm gear 12 operatively engaged or meshed with a worm 13 secured to a horizontal shaft 14 having, at an outer end thereof, a driving pulley 15 suitably fastened to the shaft 14, as by way of a set-screw 16, as clearly shown in Fig. 2 of the drawings.

The driving mechanism is enclosed in a housing comprising an upper section 17, an intermediate section 18 and a lower section 19 suitably connected together and supported partly by a bracket 20 fastened to a side of the tub 1 by means of bolts 21 and the lower section having apertured ears 22 and 23 for attachment to a stationary part of the washing machine. The lower section 19 is provided with bearings 24 and 25 for the worm shaft 14 and thrust bearings 26 and 27 for thrust collars 28 and 29 fastened to the shaft 14. The intermediate section 18 and lower section 19 are provided with bearings 30 and 31 for the vertical drive shaft 9.

Above the shaft 9 and in alinement with it is a wringer shaft 32 rotatably supported in a bearing 33 in the upper section 17 of the housing, and having secured at the lower end of the shaft 32, as by means of a cross

pin 34, is a second crank member or coupling plate 35 having a pair of radially extending coupling elements 36 formed with a notch 37 therebetween for loosely receiving the pin 7 of the lower crank or coupling element. The plate 35 has a smooth upper friction surface 38 for the engagement therewith of a friction block 39, preferably a piece of wood, capable of having frictional engagement with the surface 38 for imposing a frictional resistance or load drag thereon. The frictional member 39 is normally pressed against the plate 35 by any resilient element such as a spring 40 whose tension or compression may be regulated by a regulating screw 41 threaded into a threaded socket formed in the upper section 17 of the housing, as clearly shown in Fig. 1 of the drawings.

From the above it will be apparent that the driving mechanism operates two driven means, one including the pitman 5, rack 4 and the agitator 2 in the tub 1, and the other a wringer shaft 32 and the wringer mechanism connected thereto (not shown). In the operation of a washing machine, the wringer mechanism may or may not be operating at the same time when the remainder of the machine is operating. It has been found that with usual constructions, prior to this invention, when the wringer load is disconnected or thrown off there is a chucking or back-slapping action causing an annoying noise. Also owing to variations in manufacture and looseness arising from wear the alternate reciprocation of the pitman 5 and the rack 4 will also have chucking action between the bearing 6 and the pin 7 of the crank 8, also causing the same noise. In order to avoid this the friction means, including the block 39, is provided to frictionally engage with the disc 35 so as to impose upon it a resistance or load or drag so that when the wringer is thrown out of operation, as by uncluching the same, there would still be a sufficient load or drag upon the parts as to maintain the train of the driving mechanism in the same relation as before without a change of relation of parts causing chucking or backlashing.

The bearing member 6 is also provided with an end friction surface 43 against which presses the under surfaces of the projections 36 of the disc 35, and the other end of the bearing member 6 has a bearing surface 44 which frictionally engages with an annular portion 50 of the crank so that there is frictional engagement between the bearing 6 and the projections 36 as well as the crank portion 50. This frictional engagement may be varied or regulated by the regulating screw 21 pressing against the spring 40 and the friction member 39, which reacts against the disc 35 to impose pressure upon the bearing member 6 and the crank portion 50. The shaft 32 together with the disc 35 is longitudinally movable to the extent of permitting this adjustment.

From the above it will be apparent that any tendency to chucking action between the pitman 5 and the pin 7 will be checked or precluded by the frictional engagement between the sleeve 6 of the pitman and the projections 36 of the disc or plate 35 and the frictional portion 50 of the crank arm 8. In this way any tendency for the washing mechanism, including the pitman 5, to over-run at the ends of the reciprocations thereof will be prevented by the frictional engagement of the parts above mentioned and the chucking action or slapping noises will be avoided.

The present application discloses subject matter which is an improvement on the more generic details of construction shown in my pending application Serial No. 477,88[illegible] filed June 16, 1921, for which broad subject matter a divisional application is being filed.

While I have herein described and shown upon the drawings a preferred embodiment of the invention, it is to be understood that it is merely illustrative thereof, and that it is not limited to the particular construction details and arrangement of parts shown and described, but that other constructions, details and arrangements of parts are comprehended by the invention without departing from the spirit thereof.

Having now described my invention, I claim:

1. In a driving mechanism, a driving crank, means reciprocally driven by the crank, means rotatively driven by the crank, means imposing a given frictional engagement between the crank and the reciprocally and rotatively driven means whereby tendency to chucking between the crank and reciprocably driven and rotatively driven means is prevented.

2. In a driving mechanism, a driving crank, a pitman pivotally connected to the crank, a driven crank operatively connected to said driving crank, and means constantly pressing the pitman and driven crank against the driving crank in an axial direction to frictionally resisting chucking action between the pitman and cranks.

3. In a driving mechanism, a rotatable driving member having a drive pin eccentric to the axis of rotation of said member, a reciprocable driving element pivotally connected to the pin, a driven crank operatively connected to the pin, and means causing an axial frictional engagement between said elements crank and pin for resisting chucking action between the same.

4. In a driving mechanism of the character disclosed, a rotatable driving member having an eccentric driving element, a reciprocally driven means rotatably connected to said element, a rotatably driven means having

eccentric slot operatively receiving said element, and resistance means for imposing a given load on said rotatably driven means to eliminate chucking action of the element in the slot.

5. A silencing device for driving mechanisms, comprising a continuously rotatable member, friction means for imposing a given load on said member, a driving crank, said member cooperable with said crank to be driven thereby, said crank and member having frictional engagement for preventing over-running of said member.

6. In a driving mechanism of the character disclosed, rotatable driving and driven members, a coupling connected therebetween and having elements in driving engagement with each other, a reciprocally driven means connected to one of said elements, and means for imposing given frictional resistance in said engagement and said connection for preventing chucking action between said elements and between said reciprocally driven means and the element connected thereto.

7. In a driving mechanism of the character disclosed, alined rotatable driving and driven shafts, means operatively coupling said shafts for continuous rotatability of the driven shaft and having eccentrically connected members forming a driving crank, a reciprocable element connected to said crank between said members, and means having frictional engagement with the driven member of the eccentrically connected members for urging said members into snug operative engagement and imposing a given load upon the driving mechanism whereby chucking between the eccentrically connected members is precluded.

8. In a driving mechanism of the character disclosed, alined rotatable driving and driven shafts, means operatively coupling said shafts for continuous rotatability of the driven shaft and having eccentrically connected members, a reciprocably driven means operatively connected to one of said members, and means effecting given frictional engagement between said reciprocably driven means and the member operatively connected thereto for precluding chucking action therebetween.

9. In a driving mechanism of the character disclosed, a drive shaft, a driven shaft, a reciprocable member, a loose coupling connecting the driving shaft to said driven shaft and to said reciprocable member, and means for precluding chucking action between the parts of the coupling and between the reciprocable member and the coupling.

10. In a driving mechanism, a power driven member, means connected to and reciprocatingly driven by said power driven member, means connected to and rotatively driven by said power member and common means for eliminating loose play between the said power driven member and said reciprocable and rotary driven members.

11. In a driving mechanism, a power driven member, means permanently connected thereto and adapted to be reciprocated thereby, means permanently connected thereto and adapted to be constantly rotated thereby, said latter means being constructed and arranged to vary from no load to full load and means cooperating with said power driven member and said rotatable member for eliminating loose play when said load is removed.

12. In a driving mechanism of the character disclosed, alined rotatable driving and driven shafts, means cooperatively coupling said shafts for continuous rotatability of the driven shaft, said means having eccentrically disposed portions forming a driving crank, a reciprocable element connected to said crank between said portions, and means having frictional engagement with the driven member of the eccentrically connected portions for imposing a given load upon the driving mechanism whereby chucking between the eccentrically connected portions is precluded.

13. In a device of the character described the combination of a power shaft having a crank arm and a crank pin, an aligned driven shaft adapted to carry a load or no load and having a crank arm adapted to engage the pin whereby said aligned shaft is continuously rotated from the power shaft, a pitman operatively driven by the crank arm and actuating a member in alternately reverse directions and means for retarding the rotation of the second shaft when there is no load on such shaft.

14. In a device of the character described the combination of a power shaft and an aligned driven shaft the latter being adapted to carry a load or no load, a crank adapted to connect said shafts and to rotate the aligned shaft continuously from the power shaft, a pitman connected to the crank for driving a member alternatively in opposite directions and means for retarding the rotation of the aligned shaft when it has no load.

15. In a device of the character described the combination of a power shaft having a crank arm formed with an outstanding pin, an aligned driven shaft having a crank arm adapted to engage the pin so as to be continuously rotated by the power shaft, a pitman engaging the pin of the crank arm, the crank arm of the driven shaft having a friction surface and a drag member pressing against said surface.

16. In a device of the character described the combination of a power shaft having a crank arm formed with an outstanding pin, an aligned driven shaft having a crank arm adapted to engage the pin so as to be con-

tinuously rotated by the power shaft, a pitman engaging the pin of the crank arm and adapted to drive a member in alternate reverse directions, the crank arm of the driven shaft having a friction surface concentrically surrounding the shaft, and a friction block adapted resiliently to press against said surface, and means for adjusting the pressure of the friction block against said surface.

17. In a device of the character described the combination of a power shaft having a crank arm formed with an outstanding pin, an aligned driven shaft having a forked or slotted crank arm adapted to engage the pin so as to be continuously rotated by the power shaft, a pitman engaging the pin of the crank arm and adapted to drive a member in alternate reverse directions, the crank arm of the driven shaft having a friction surface concentrically surrounding the shaft, and a friction block adapted resiliently to press against said surface at the side opposite the connection of the arm and the pin.

18. In a device of the character described the combination of a power shaft having a crank arm formed with an outstanding pin, a pitman having an apertured end mounted on said pin and adapted to actuate a member alternately in reverse directions, an aligned shaft having a forked arm connecting with said pitman and pin so as to be continuously rotated by the power shaft, said crank arm of the driven shaft having a friction surface concentrically surrounding the driven shaft, and a friction block adapted resiliently to press against the friction surface and thereby press the forked crank arm against the pitman.

In witness whereof, I hereunto subscribe my name to this specification.

HOWARD F. SNYDER.

Nov. 27, 1928.

1,693,003

H. F. SNYDER

PACKING AND PACKING DEVICE

Filed June 14, 1922

Fig 1

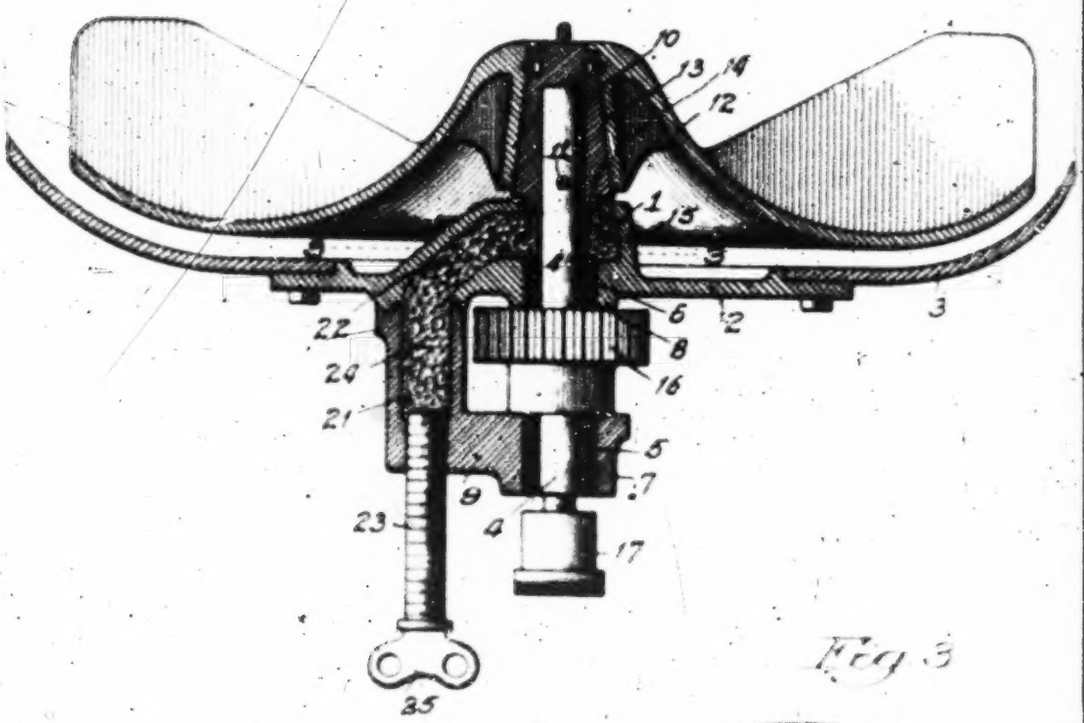


Fig 3

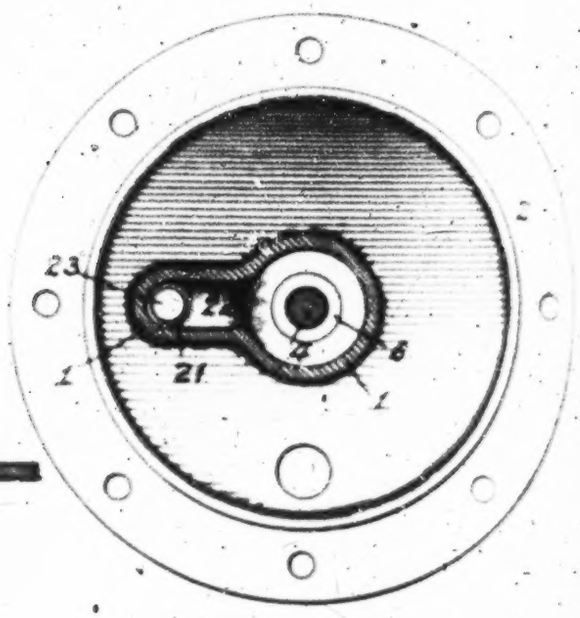
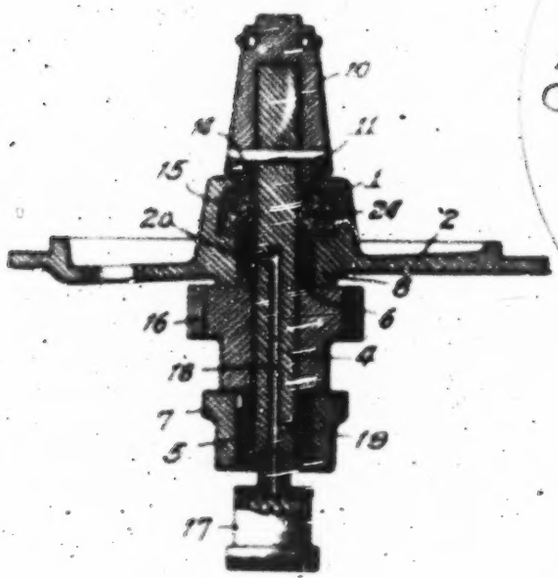


Fig 2



Inventor
Howard F. Snyder
by Wallace R. Lane
Atty

1062

Patented Nov. 27, 1928. 1,693,003

UNITED STATES PATENT OFFICE.

EDWARD F. SNYDER, OF NEWTON, IOWA, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE MAYTAG COMPANY, OF NEWTON, IOWA, A CORPORATION OF DELAWARE.

PACKING AND PACKING DEVICE.

Application filed June 14, 1922. Serial No. 568,157.

The invention relates to packings and packing devices, and more particularly to the type of packings and packing devices adapted for use with oscillating and rotating shafts.

Among the objects of the invention are to provide a new type of packing and packing device adapted for use in washing machines, particularly that having an agitator operated by a shaft extending through the bottom of the tub; to provide a construction wherein the packing surrounds the shaft and is located between the bearings for the shaft; to provide means, preferably in the form of a screw plunger, for applying pressure, from time to time, as may become necessary, to compensate for the loss in packing owing to wear and leakage of the packing through the bearing or bearings; to provide a packing of comminuted asbestos and graphite, with or without oil, so that the packing mass will be in a sort of fluidal state, whereby, when pressure is applied to the mass, as by a screw plunger, the mass will flow about the shaft and into the bearing or bearings and not only lubricate the same but also form a water seal about the shaft and for the bottom of the tub; and such further objects, advantages and capabilities as will hereinafter more fully appear.

My invention further resides in the composition of matter, combination, construction, and arrangement of parts described herein and illustrated in the accompanying drawings, and while I have shown therein a preferred embodiment, I desire the same to be understood as only illustrative of and not as limiting my invention.

In the accompanying drawing illustrating my invention:—

Fig. 1 is a vertical sectional view through the packing device and a portion of a washing machine.

Fig. 2 is a detail sectional view through the agitator supporting and operating means.

Fig. 3 is a sectional view taken on line 3—3 of Fig. 1.

Referring more in detail to the drawing, the packing device illustrated comprises a chamber 1 forming an integral portion of a plate 2 bolted to, and closing the lower opening of, a tub 3 of a washing machine. An agitator shaft 4 extends vertically through the chamber 1 and is rotatably supported in bushings 5 and 6 respectively located in bearing hubs 7 and 8 forming integral portions of the plate 2 and a bracket 9 secured, in a suitable manner, to the underside of the plate 2. To the upper end of the shaft 4 is fastened a step 10 by means of the cross-pin 11 extending transversely through the shaft 4. The step 10 is of pyramidal form and square in cross section. It extends upwardly above the bottom of the tub 3 and supports an agitator 12 which has a depending hollow socket 13, also square in cross section, to fit upon the step. The step has a lower end portion 14 of cylindrical form which rotatably fits into a circular opening provided in the upper wall of the chamber 1. Against the lower end of the step and surrounding the shaft, as well as fitting in the opening in the upper wall of the chamber 1, is a leather packing washer 15.

Upon the shaft 4 between the hubs 7 and 8, is keyed a pinion 16 which is in thrust engagement with the hubs 7 and 8. This pinion is designed to be operated by a reciprocating rack driven by the operating mechanism of the washing machine, in order to give the agitator, through the media of the pinion 16, the shaft 4 and step 10, an angular reciprocation or oscillation within the tub 3. The lower end of the shaft has a grease cup 17 for supplying a suitable lubricant, to the bearings, in bushings 5 and 6, through the bores 18, 19 and 20 provided in the shaft 4.

The bracket 9 is provided, at one side, with a plunger chamber 21 communicating with the chamber 1 by means of a passage 22 formed integral with the chamber 1. In the lower portion of the bracket 9 is provided a threaded aperture designed to receive a screw plunger 23 into the plunger chamber 21. Within the plunger chamber 21, the passage 22, and the chamber 1, is located a packing or packing material 24 composed preferably of asbestos, graphite and oil. The asbestos is cut into fine pieces or shredded so as to provide a comminuted mass. The lower end of the plunger 23 has a finger piece 25 by which the plunger may be manually rotated to apply pressure to the packing material and cause the same to be forced along the passage 22 and into the chamber 1 around the shaft 4, and against the packing washer 15 and the upper wall of the chamber. The packing material is semi-plastic and in a sort of a fluidal state such

that when the plunger is operated to stress the mass in the plunger chamber it will cause the packing to flow through the passage 22 and into the chamber 1. In this way any loss of material owing to wear or leakage through the bearings will be compensated for by a simple turn of the plunger screw. In this way leaking of the cleansing or other fluids contained in the tub 3, downwardly through the opening in the upper wall of the chamber, will be prevented.

In addition to the packing material acting as a packing it also acts as a lubricant owing to its oil and graphite constituents. At the same time the bearings in bushings 5 and 6 will be maintained lubricated by the lubricating ingredients contained in the packing material.

It is of course understood that the specific description of structure and composition of matter set forth above may be departed from without departing from the spirit of my invention as set forth in this specification and the appended claims.

Having now described my invention, I claim:

1. A shaft packing and lubricating device for washing machines comprising bearings for said shaft, a packing chamber surrounding said shaft, said chamber having side walls connected to the bottom portion of a washing machine and making a tight closure to prevent any leakage from said machine, a plunger chamber eccentrically located with respect to said shaft, a passage extending from said plunger chamber and extending to said packing chamber, a fluidal packing in said chambers and passage, and a vertically disposed screw plunger located in said eccentrically disposed plunger chamber and operable to compensate for loss and to lubricate said bearings.

2. A shaft packing and lubricating device for washing machines comprising bearings for said shaft, a packing chamber surrounding said shaft, said chamber having side walls connected to the bottom portion of a washing machine and making a tight closure to prevent any leakage from said machine, a plunger chamber eccentrically located with respect to said shaft, a passage extending from said plunger chamber and extending to said passage chamber, a fluidal packing in said chambers and passage, and means in said eccentrically disposed plunger chamber operable to compensate for loss and to lubricate said bearings.

3. A shaft packing and lubricating device for washing machines, comprising a combined plate and bracket secured to the bottom of a washing machine and preventing leakage therefrom, bearings secured in said bracket member, a packing chamber surrounding said shaft, a plunger chamber eccentrically located with respect to said shaft, a passage extending from said plunger chamber and extending to said packing chamber, a fluidal packing in said chambers and passage, and a vertically disposed screw plunger located in said eccentrically disposed plunger chamber and operable to compensate for loss and lubricate said bearings.

4. A shaft packing and lubricating device for washing machines, comprising a combined plate and bracket secured to the bottom of a washing machine and preventing leakage therefrom, bearings secured in said bracket member, a packing chamber surrounding said shaft, a plunger chamber eccentrically located with respect to said shaft, a passage extending from said plunger chamber and extending to said packing chamber, a fluidal packing in said chambers and passage, and means in said eccentrically disposed plunger chamber and operable to compensate for loss and to lubricate said bearing.

5. A shaft packing and lubricating device for washing machines, comprising a combined plate and bracket secured to the bottom of a washing machine and preventing leakage therefrom, bearings secured in said bracket member, a packing chamber located above said bearings and surrounding said shaft, a plunger chamber eccentrically located with respect to said shaft, a passage extending from said plunger chamber and extending to said packing chamber, a fluidal packing in said chambers and passage, and means in said plunger chamber operable to compensate for loss and to lubricate said bearings.

In witness whereof I hereunto subscribe my name to this specification.

HOWARD P. SNYDER

1051

May 28, 1929. H. F. SNYDER 1,714,894

VACUUM AGITATOR FOR WASHING MACHINES

Original Filed Jan. 14, 1922

Fig. 1

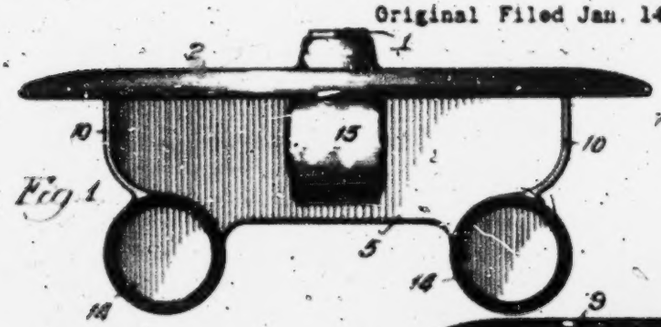


Fig. 2

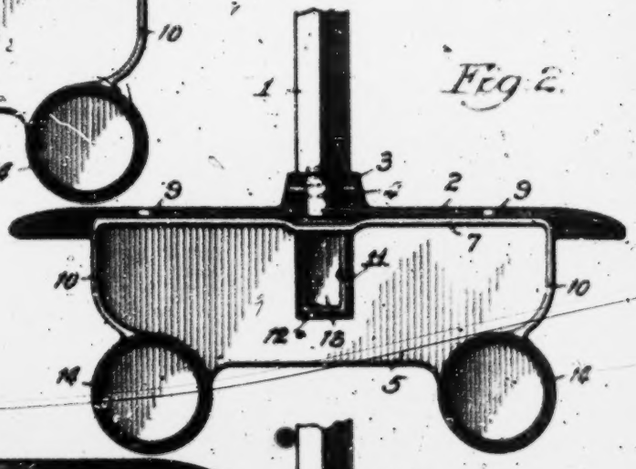


Fig. 3

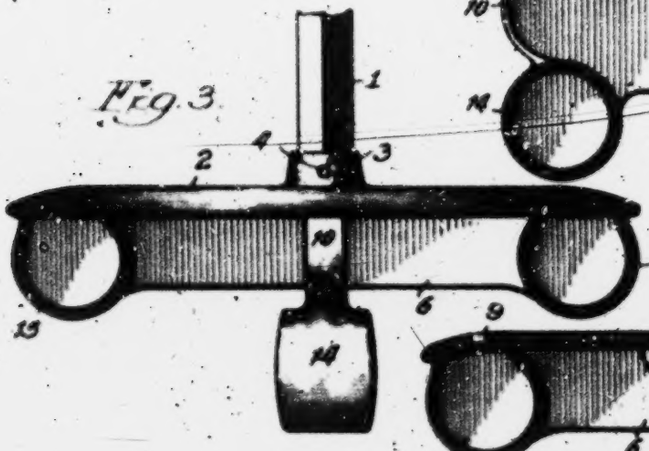


Fig. 4

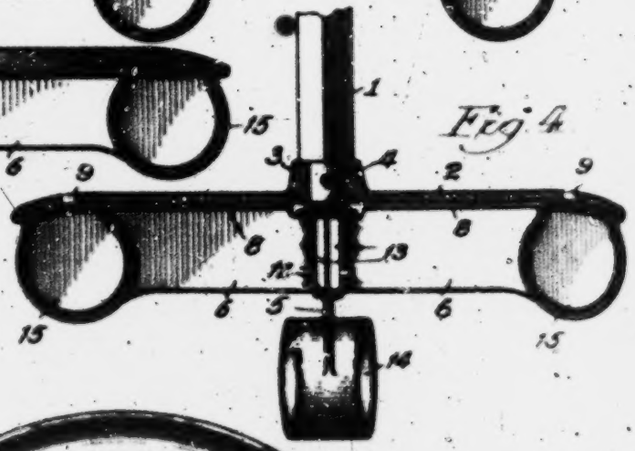
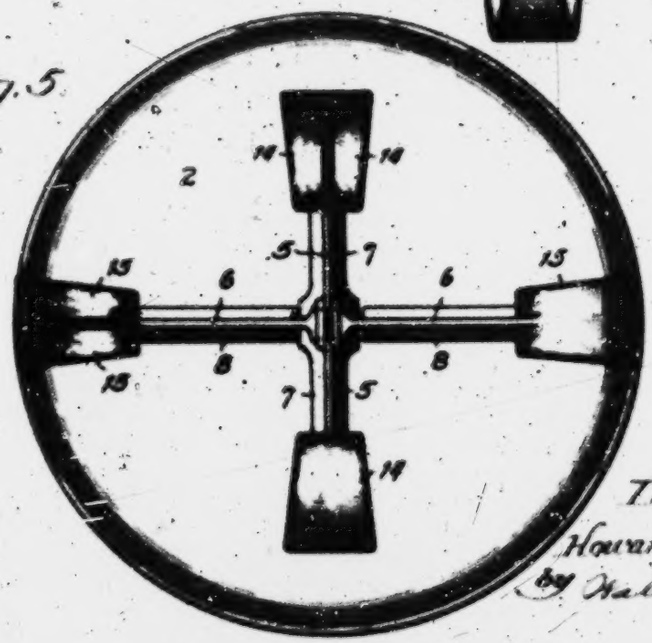


Fig. 5



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1065

Patented May 28, 1929. 1,714,894

UNITED STATES PATENT OFFICE.

HOWARD F. SNYDER, OF NEWTON, IOWA, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE MAYTAG COMPANY, OF NEWTON, IOWA, A CORPORATION OF DELAWARE.

VACUUM AGITATOR FOR WASHING MACHINES.

Application filed January 14, 1928, Serial No. 529,131. Renewed March 14, 1927.

My invention relates primarily to an agitator or dolly for use in a machine of the oscillating dolly type and among the objects thereof are to provide an improved washing machine agitator; to provide a structure of the character described having suction cups adapted to act on articles being washed in a manner somewhat similar to that of a reciprocating suction cup device; to provide an oscillating dolly with suction cups to assist in forcing water through the clothing being washed; and such further objects, advantages and capabilities as will later more fully appear.

My invention further resides in the combination, construction and arrangement of parts illustrated in the accompanying drawing, and while I have shown therein a preferred embodiment I desire the same to be understood as illustrative only and not as limiting my invention.

In the accompanying drawing:

Fig. 1 is an elevation showing my improved agitator.

Fig. 2 is a vertical section taken substantially centrally of the device as shown in Fig. 1.

Fig. 3 is an elevation similar to Fig. 1 but taken in a direction at right angles thereto.

Fig. 4 is a section similar to Fig. 2 but taken in a direction at right angles thereto.

Fig. 5 is a view from the under side of Fig. 1, but showing parts of the structure in section.

Referring more in detail to the annexed drawing, numeral 1 designates the usual power driven agitator shaft, which may be circular or angular in cross section, depending upon the construction of the machine with which this device is to be used. Numeral 2 designates the body plate of the agitator having substantially centrally thereof a boss 3 through which passes a securing screw 4 to secure the shaft 1 to the plate 2. Webs 5 and 6 are provided with flanges 7 and 8 to assist in preventing them from rocking when secured to the plate 2 by means of projections 9. The web 5 has its flange 7 continued around the ends as shown at 10 to serve as reinforcing means for the strengthening of the web. Web 5 has an aperture 11 therethrough which is bordered by a flange 12 on each side of the web and webs 6 have each one end such as 13 shaped to fit into the perforation 11, as shown in Figs. 4 and 5.

These ends 13 are preferably considerably heavier than the webs and therefore assist in furnishing a secure bearing to prevent distortion and breaking of the parts in use. On each side of each free end, the webs are provided with flanges which form cups 14 and 15, the former being substantially circular and the latter being somewhat flattened on one side to fit closely against the under face of the plate 2, as shown most clearly in Fig. 4.

It will be obvious from the foregoing description that, as the agitator shaft 1 is oscillated, first one set of cups 14, 15 will act upon the clothing in the machine, and then the other set will act thereon as the agitator is oscillated in the opposite direction. It will therefore be clear that these cups 14 and 15 will force water through the clothing, besides performing the ordinary function of oscillating the clothing in the machine in the manner of dollies provided with pegs.

It is of course understood that the specific description of structure set forth above may be departed from without departing from the spirit of my invention.

Having now described my invention, I claim:—

1. In a dolly, a substantially imperforate member adapted to be oscillated about an axis, said member having a blade extending therefrom, said blade having a suction cup thereon disposed transversely to the plane of said member.

2. A dolly comprising an oscillatory plate having downwardly extending projections, and laterally directed suction cups on said projections.

3. A washing machine agitator comprising an agitator shaft, a plate secured thereto, and agitator members extending transversely of one face of the plate and having cups thereon facing laterally.

4. A washing machine agitator comprising an agitator shaft, a plate secured thereto, and agitator members having suction cups on opposite faces thereof extending substantially perpendicularly to the body of the plate.

5. A washing machine agitator comprising an agitator shaft, a plate secured thereto, and agitator members having suction cups on opposite faces thereof extending substantially perpendicularly to the body of the plate, one of said members comprising a web-member having an aperture therethrough

and the other agitator members comprising web-members each provided at one end with a portion adapted to fit into the aperture in the first named web-member.

6. In a dolly, an oscillatory support having projections rigid therewith, and suction cups being formed in said projections remotely of the axis of oscillation of said support.

7. An agitator for effecting washing operations, comprising a substantially imperforate disk oscillatable about an axis and formed with a relatively deep member projecting from said disk, said disk having a cup-shaped portion thereon operative to press upon the material to be washed when moved in one-direction and to create a suction when moved in the opposite direction.

8. An agitator for effecting washing operations, comprising a substantially imperforate disk oscillatable about an axis and cup-shaped members rigid with said disk for movement therewith during the alternately rotary movements thereof, said cup-shaped portions operative to press upon the material to be washed when moving in one direction and to create a suction when moving in the opposite direction.

9. A dolly comprising an oscillatory plate formed with transversely arranged suction cups at the border of said plate remote from the axis of oscillation of said plate.

10. A dolly comprising a vertical shaft, a disc fixed to said shaft, and suction cups fast with said disc, near the periphery of said disc.

11. A dolly comprising a shaft, a plate fixed to the shaft, and suction cups depending from the edge portions of the plate.

12. A dolly comprising an oscillatory disk having transversely disposed suction elements thereon and arranged at variant distances from the axis of oscillation of said disk.

13. A dolly comprising an oscillatory disk having suction elements thereon arranged at variant distances from one surface of said disk and also arranged at different distances also laterally of the disk.

14. A dolly comprising an oscillatory disk having transversely disposed suction elements thereon arranged to travel in different horizontal planes during the oscillation of the disk.

15. A dolly having suction cups connected therewith, said cups being positioned in different horizontal planes so as to travel in different horizontally disposed paths in the liquid.

16. A dolly comprising a vertical oscillatable shaft and carrying a plurality of suction cups having their open mouths disposed substantially transversely to the axis of the shaft and arranged in different horizontal planes.

17. A dolly comprising a vertical oscillatable power driven shaft having substantially flat webs extending horizontally therefrom and at right angles to each other, each of said webs carrying a plurality of suction cups arranged so that their open mouths oscillate in horizontal paths.

18. A dolly comprising a vertical oscillatable power driven shaft having substantially flat webs extending horizontally therefrom, said webs being of different widths, and said webs carrying suction cups adapted to oscillate in horizontal planes.

19. A dolly comprising a vertical oscillatable power driven shaft having substantially flat webs extending horizontally therefrom, said webs being of different widths, and carrying suction cups disposed in different horizontal planes.

20. A dolly comprising a plate oscillatable in a horizontal plane and suction cups having their open mouths disposed at an angle to the plane of the plate and oscillatable therewith.

21. A dolly comprising an oscillatory plate, vertically disposed webs carried by the plate and suction cups carried by the webs.

22. A power driven oscillatable shaft, vertically disposed webs extending from the shaft to oscillate in a horizontal plane and suction cups carried by the webs.

23. A power driven oscillatable shaft, four webs radially carried by the shaft, each of said webs carrying suction cups having their open mouths facing at an angle to the axis of oscillation of the shaft.

24. A dolly comprising an oscillatory disc provided with suction elements having their axes transversely disposed.

25. A dolly comprising a shaft and an oscillatory disc provided with suction elements having their axes transversely disposed with reference to said shaft.

In witness whereof, I hereunto subscribe my name to this specification.

HOWARD F. SNYDER

1067

Oct. 1, 1929. H. F. SNYDER 1,729,751

GYRATATOR WITH HIGH CENTER DRIVE

Filed March 20, 1925 2 Sheets-Sheet 1

Fig. 1.

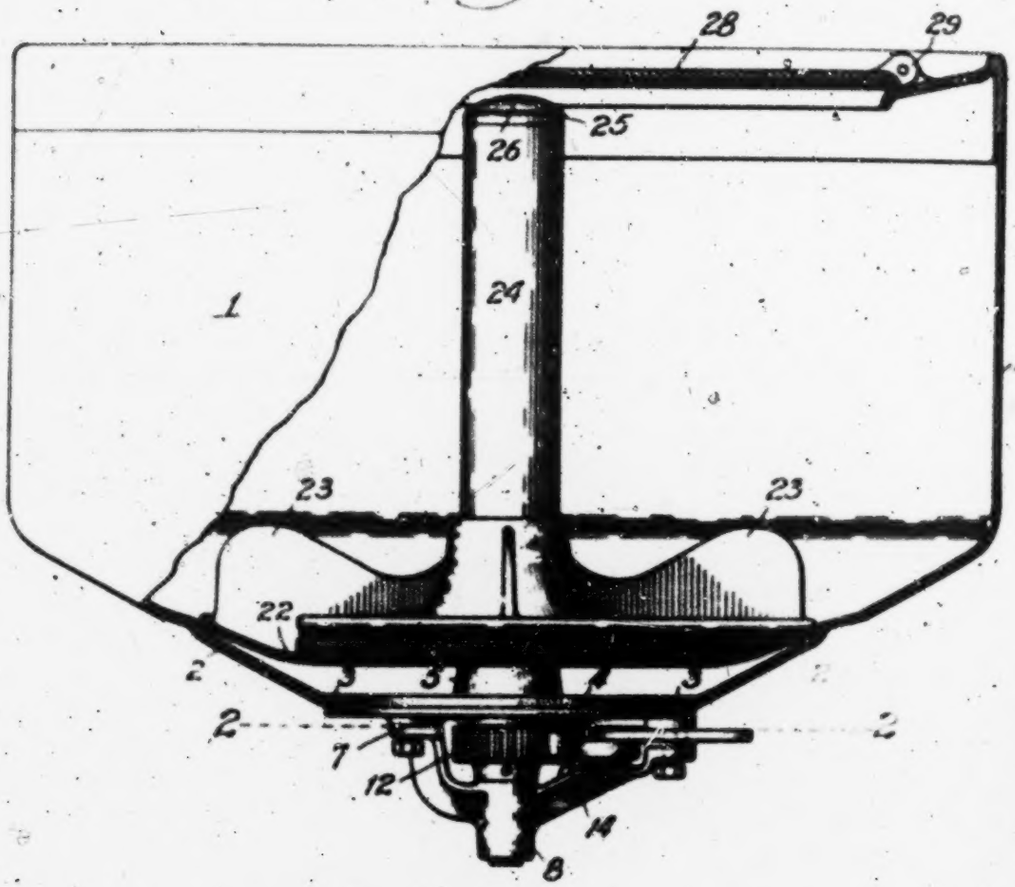
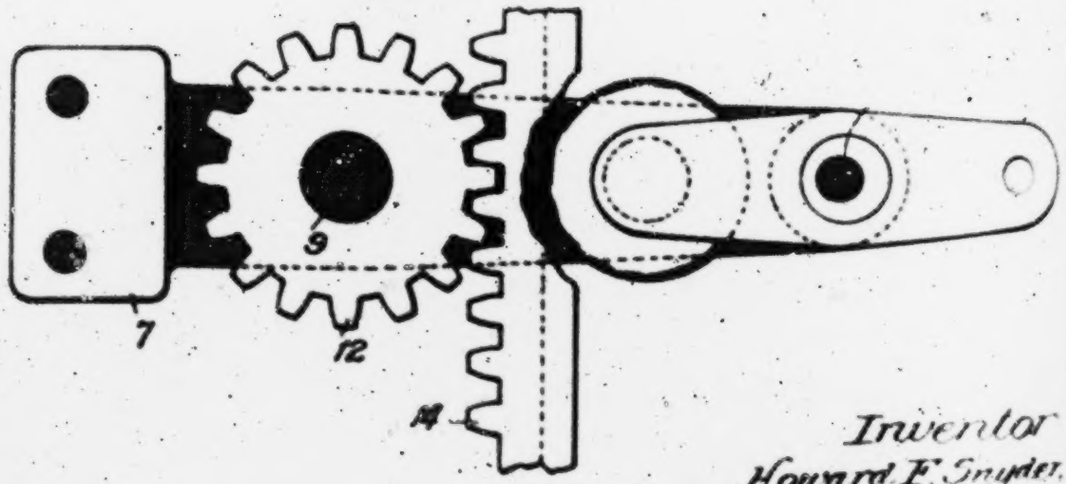


Fig. 2.



Inventor
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1058

Oct. 1, 1929. H. F. SNYDER 1,729,751

GYRATATOR WITH HIGH CENTER DRIVE

Filed March 20, 1925 2 Sheets-Sheet 2

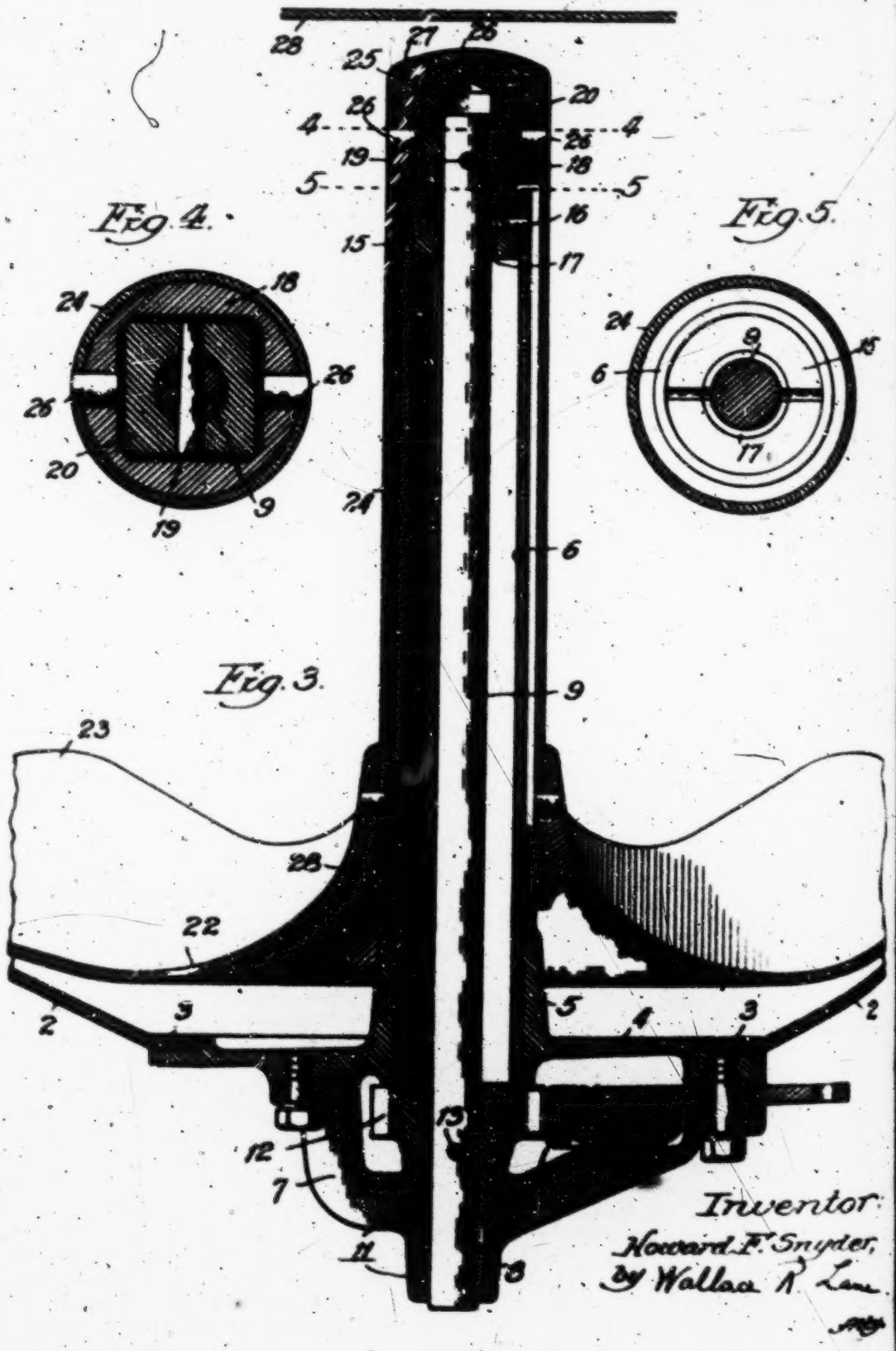

Fig. 4.

Fig. 5.

Fig. 3.

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by Wallace R. Lee
Atty

Patented Oct. 1, 1929 1,729,751

UNITED STATES PATENT OFFICE

EDWARD F. SNYDER, OF NEWTON, IOWA, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE MAYTAG COMPANY, OF NEWTON, IOWA, A CORPORATION OF DELAWARE

GYRATATOR WITH HIGH CENTER DRIVE

Application filed March 20, 1926. Serial No. 16,949.

My invention relates to washing machines and particularly the agitator mechanism thereof and to the means for driving the agitator from a drive shaft which projects upwardly through the base of the tub.

One of the objects of my invention is to provide an improvement in the agitator construction shown in my Patent No. 1,506,783 issued Sept. 2, 1924, by providing the substantially disk-like agitator therein shown with a central cylindrical stem rising to a point well above the upper plane of the upstanding blades, this upstanding stem being substantially smooth on its outer surface and having a smooth closed upper portion. By means of this construction any tendency of the fabrics to accumulate at the central portion of the agitator above the upstanding blades thereof is entirely eliminated because the swirling fabrics will contact with the smooth walls of this upstanding stem and will be maintained out of rubbing engagement with the oscillating blades of the agitator. In addition, by extending this upstanding stem well above the normal liquid level of the water in the tub and forming the interior of the upstanding stem with a driving connection to the driving shaft which projects upwardly through the bottom of the tub, any leakage of water through the base of the tub is prevented.

One of the objects of the present invention is to provide a rotatable agitator wherein the agitator is provided with a basal liquid impelling member and a central upstanding stem which projects substantially to the top of the tub and forms a housing and driving connection to the shaft which projects upwardly through an opening in the bottom of the tub.

Another object of my invention is to provide a construction which will eliminate the necessity of the packing around the rotatable drive shaft where the shaft enters the bottom of the tub.

Another object of my invention is to provide a novel non-leakable connection between the drive shaft which projects through the bottom of the tub and the agitator driven by the shaft.

Still another object of my invention is to provide a novel construction of a detachable agitator which comprises a lower bladed portion and a central upstanding smooth surfaced stem which projects substantially to the top of the tub and above the water line, the stem forming a substantially water-tight connection above the waterline with the upstanding drive shaft which projects upwardly through the bottom of the tub.

Still another object of my invention resides in the novel arrangement of upper and lower bearing members of the drive shaft which projects through the base of the tub which bearing members are rigidly carried by suitable brackets disposed both within and without the basal wall portion of the tub.

Another object of the invention resides in the novel construction of the agitator having a lower bladed portion and a high center detachable connection with the upstanding drive shaft which projects centrally up through the bottom of the tub.

These and other objects of the invention will become apparent from a perusal of the following specification wherein:—

Figure 1 is a side view of the tub with parts of the casing wall broken away so as to expose the agitator to view.

Figure 2 is a view on line 2—2 of Figure 1.

Figure 3 is a sectional view of the agitator mechanism.

Figures 4 and 5 are sectional views taken on lines 4—4 and 5—5 of Figure 3.

Referring now to the drawings in detail, the tub 1 is preferably of the shape shown in my Patent 1,506,783 granted Sept. 2, 1924. The tub is shown as provided with downwardly tapering basal walls 2 which terminate in rim 3 to which is rigidly connected a center bridge plate 4 preferably of aluminum. This plate 4 closes the opening in the base of the tub. This center bridge plate 4 is provided with an integral upstanding boss or sleeve 5 which forms a rigid connection for relatively long upstanding stand-pipe 6, preferably of brass. This stand-pipe is rigidly connected in place by means of a press fit. To the bottom of the center bridge

plate and exterior thereof is disposed a bearing bracket 7. This bearing bracket is formed with a sleeve like portion 8 which is spaced somewhat from the end of the sleeve 5. A drive shaft 9 is disposed with one end in this bearing 8 and extends upwardly through the stand-pipe 6, the upper end of the shaft projecting beyond the upper end of the stand-pipe and substantially up to the top of the tub. Oilless bearing pieces of graphite bronze, what is known to the trade as durex, are disposed between the lower end of the shaft 9 and the bearing 8. These are indicated by the reference numeral 11. A pinion 12 is pinned to the shaft as at 13 between the bearing 8 and the lower portion of the sleeve 5. This pinion 12 meshes with a rack 14 mounted on the bracket 7. This rack constitutes a portion of the means for alternately rotating the drive shaft 9 as is well known in the art.

The upper end of the shaft is provided with a bearing comprising a bearing retainer which is a circular ring of aluminum designated by the numeral 15. This ring is secured to the upper end of the stand pipe by means of a tapered pin 16. Between the inner wall of this ring and the shaft 9 is located another oilless bearing 17, in which the upper end of shaft 9 rotates. The upper face of this aluminum bearing 15 is provided with an oil groove 18 which leads to the shaft. The upper end of the stand-pipe projects above the normal liquid level in the tub.

To the upper end of the shaft 9 there is pinned as at 19 an angularly shaped torque block 20 preferably of brass. In Figure 4 the shape of this block is shown as square. This block forms a detachable driving connection for the agitator.

In the present instance the agitator comprises lower trough like disk 22 having one or more upstanding blades 23 thereon and preferably radiating from the center of axis of rotation of the agitator. At its central point the agitator is provided with a relatively long upstanding smooth-walled stem which projects upwardly above the upper end of the shaft 9. In the present instance the stem portion 24 of the agitator is rigidly connected to the trough like portion of the agitator by means of rivets which are flush with the exterior of the agitator.

The outer wall of the stem 24 is preferably smooth and circular. At its upper end it is provided with a drive hub 25 preferably of aluminum. This drive hub is connected to the upper end of the stem by means of the pin 26. The inner wall of this hub is formed angularly, preferably square, to correspond to the contour or cross-section of the torque block 20. The upper end of the drive hub 25 is provided with an aluminum cap 28 which is held in place by rolling over the periphery of the drive hub as shown at 27. The inner basal wall of the trough like portion 22 of the agitator is provided with a hub which forms a snug but rotatable fit about a bronze bearing sleeve 28 which sleeve 28 is attached to the stand-pipe 6 as by means of a press fit. This sleeve 28 constitutes a steadying bearing for the power portion of the agitator. It will be evident that the agitator includes the cylindrical stem 24 and can be bodily detached from the pipe 6 and torque block 20 merely by withdrawing the agitator endwise from the shaft and block. The detachable connection between the angular block 20 and the hollow drive hub 25 permits this.

By thus constructing my new agitator it must be apparent that when the same is oscillated by means of the driving mechanism the liquid in the tub will be thrown outwardly by means of the upstanding blade 23, substantially along the upwardly inclined basal portions of the tub 1, then upwardly parallel with the sides of the tub 1 to the top of the tub, thence inwardly and toward the smooth walled cylindrical member 24 and downwardly toward the blades 23. It must be evident that the smooth walled cylindrical upstanding stem 24 with its smooth dome portion 25 provides a means for preventing downward deflection of the fabrics carried by the swirling currents of water, on to the central portion of the agitator. Without this upstanding stem 24 these fabrics might possibly accumulate at the central portion of the agitator and tend to accumulate in a knot or tangle at this point. At the same time by extending his central stem above the normal liquid level of the tub and forming the interior with the driving connection, all danger of leakage of water through the bottom of the tub is eliminated.

As shown in Figure 1 and also in Figure 3, the upper portion of the cylindrical stem projects substantially to the top or cover of the tub, which cover 28 is shown as provided with a hinged connection 29.

Having thus described my invention I claim:

1. In a washing machine, a tub, a member of tubular form having one end rigidly engaging the bottom wall of said tub so as to provide a stand pipe, a drive shaft extending axially within said stand pipe, an angular torque-block carried by one end of said shaft, an agitator rotatably engaging the tubular body of the stand pipe and provided with a tubular stem enclosing said stand pipe, and a drive member located within said stem and provided with an angular pocket complemental to and engaging said torque-block so that said shaft and said stem will rotate together.

2. In a washing machine, a tub, a tubular member having one end normally fixed with

respect to the bottom of said tub so as to provide a stand-pipe, a drive shaft extending axially through said stand-pipe, an agitator provided with an upwardly curved central portion and a central upwardly extended tubular deflecting stem enclosing said stand-pipe and provided with a smooth exterior surface, and means connecting said stem to said shaft so that they will rotate together, said stem being positioned to rotate about said stand-pipe.

3. In a washing machine, a tub, a tubular member having one end normally fixed with respect to the bottom of said tub so as to provide a stand-pipe, a drive shaft extending axially through said stand-pipe, an agitator provided with an upwardly curved central portion and a central upwardly extending tubular deflecting stem enclosing said stand-pipe and provided with a smooth exterior surface, means connecting the upper end of said stem with the adjacent end of said shaft so that they will rotate together, said stem being positioned to rotate about said stand-pipe, and a bearing interposed between the lower portion of said stem and the contiguous portion of said stand-pipe.

4. In a washing machine, a tub having an apertured bottom provided with an upstanding sleeve concentric with the aperture thereof, a tubular stand-pipe having one end inserted into said sleeve so as to be supported thereby, a bearing in the other end of said stand-pipe, a second bearing independent of said stand-pipe, a drive shaft extending axially within said stand-pipe and journaled in said bearings, an agitator provided with an upwardly curved central portion and a central upwardly extended tubular deflecting stem enclosing said stand-pipe and provided with a smooth exterior surface, and means connecting said stem to said shaft so that they will rotate together, said stem being positioned to rotate about said stand-pipe.

5. In a washing machine, a tub having an apertured bottom, a bridge plate closing the aperture and provided with an upstanding sleeve concentric with said aperture, a tubular stand-pipe having one end inserted into said sleeve, so as to be supported thereby, a bearing in the other end of said stand-pipe, a second bearing carried by said bridge plate, a drive shaft extending axially through said stand-pipe and journaled in said bearings, an agitator provided with an upwardly curved central portion and a central upwardly extended tubular deflecting stem enclosing said stand-pipe and provided with a smooth exterior surface, and means connecting said stem to said shaft so that they will rotate together, said stem being positioned to rotate about said stand-pipe.

6. In a washing machine, a tub, a tubular member having one end normally fixed with respect to the bottom of said tub so as to provide a stand-pipe, a drive shaft extending axially through said stand-pipe, an agitator provided with an upwardly curved central portion and a central upwardly extended tubular deflecting stem enclosing said stand-pipe and provided with a smooth exterior surface, means connecting said stem to said shaft so that they will rotate together, and means for oscillating said shaft, said impeller having means so positioned that the oscillation of the shaft will cause the contents of the tub to move outwardly and upwardly, said deflecting stem being positioned to rotate about said stand-pipe so as to prevent moving articles within the tub from accumulating at the center of the impeller.

In witness whereof, I hereunto subscribe my name to this specification.

HOWARD F. SNYDER.

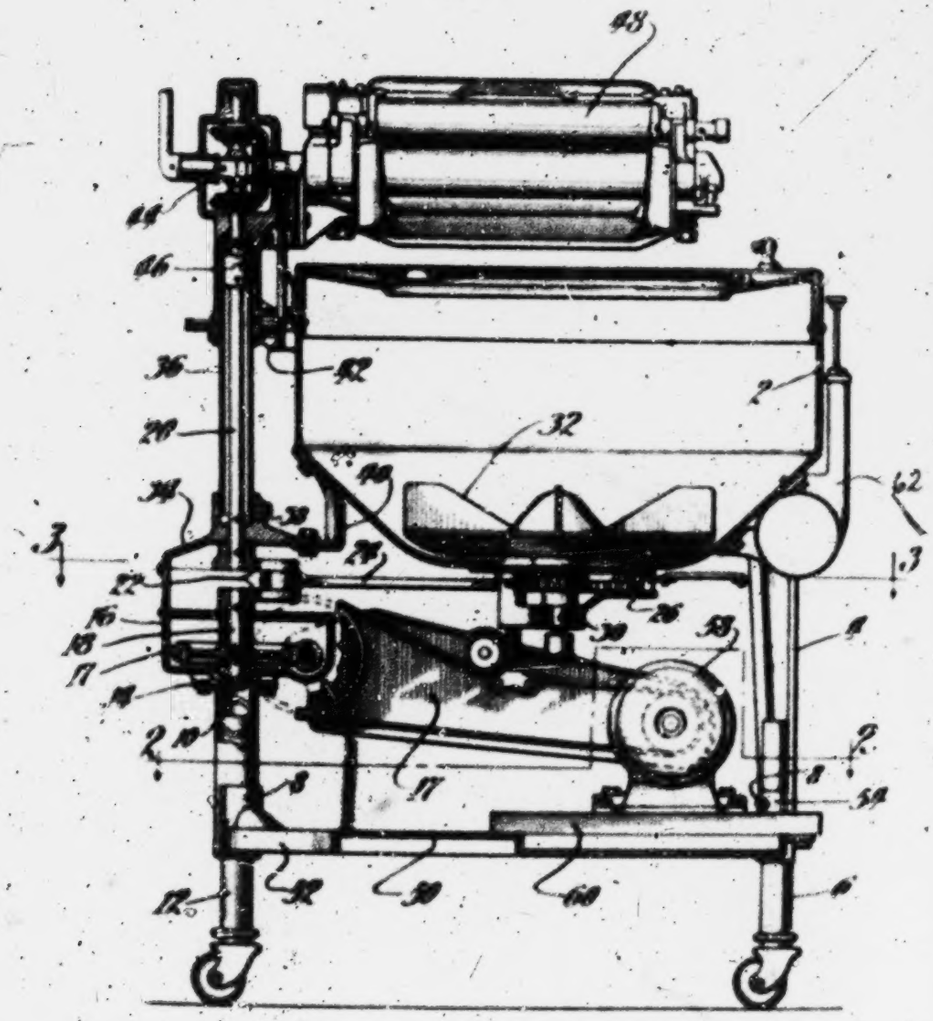
1072

Sept. 11, 1934. H. F. SNYDER 1,973,23

WASHING MACHINE

Original Filed June 14, 1922 2 Sheets-Sheet

Fig. 1.



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1073

Sept. 11, 1934. H. F. SNYDER 1,973,230

WASHING MACHINE

Original Filed June 14, 1922 2 Sheets-Sheet 2

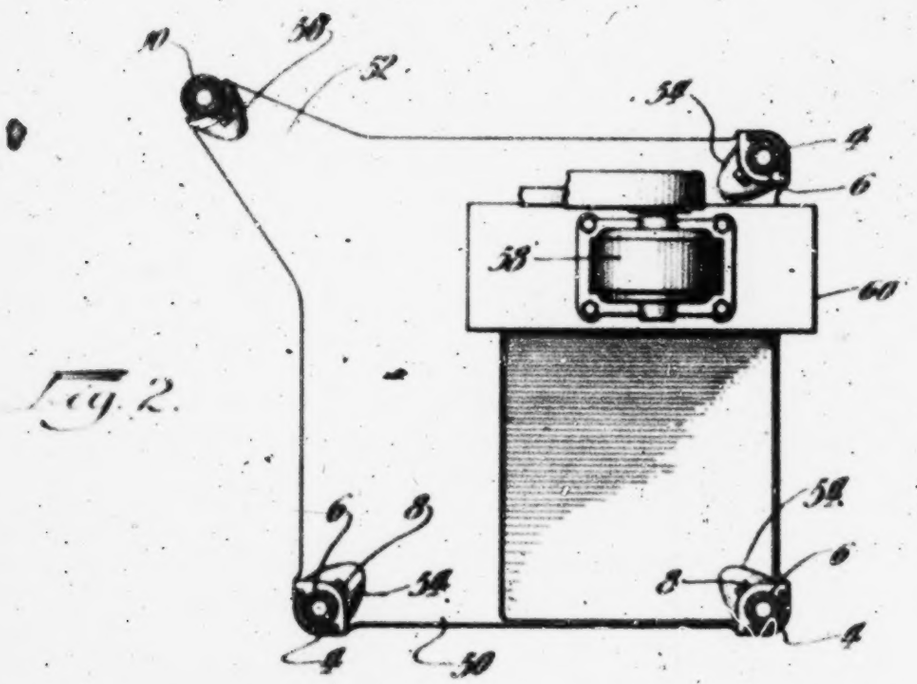

Fig. 2.

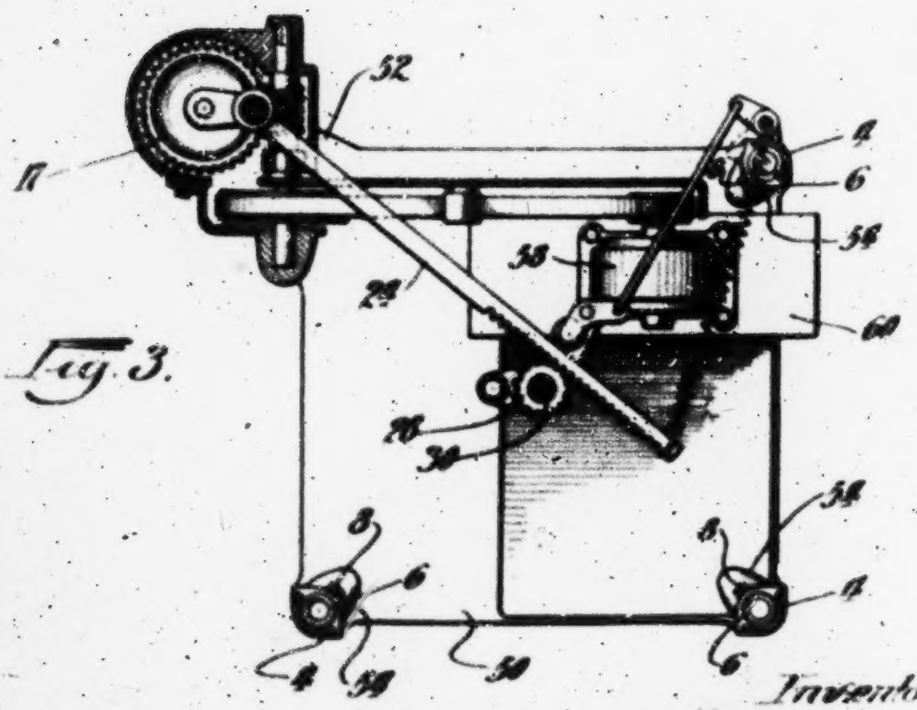

Fig. 3.

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CERTIFICATE OF CORRECTION.

Patent No. 1,973,230. September 11, 1934.

HOWARD F. SNYDER.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 4, lines 38 and 39, claim 6, for "tube" read tub; and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 9th day of October, A. D. 1934.

Leslie Frazer

(Seal) Acting Commissioner of Patents.

Patented Sept. 11, 1934

1,973,230

1074

UNITED STATES PATENT OFFICE

1,973,230

WASHING MACHINE

Howard F. Snyder, Newton, Iowa, assignor to The Maytag Company, Newton, Iowa, a corporation of Delaware

Original application June 14, 1932, Serial No. 568,158, now Patent No. 1,966,779, July 12, 1932. Divided and this application June 26, 1927, Serial No. 202,477

9 Claims. (Cl. 68—15)

This invention relates to washing machines and particularly that type of power machines having a driven agitator within, and a driven wringer mechanism above the tub, in combination with driving mechanism for transmitting power to the driven elements; for example, as shown in my co-pending applications Serial No. 568,158, filed June 14, 1932, Patent No. 1,966,779, July 12, 1932 and Serial No. 477,888, filed June 16, 1921, Patent No. 1,644,889, Oct. 11, 1927, the present application being a division of said application Serial No. 568,158, and a continuation in part of said application Serial No. 477,888.

In the prior machines the comparatively massive and cumbersome gearing mechanism for driving the agitator within the tub and the wringer above was mounted directly on one side and carried by the tub, thus subjecting the tub body to all the strains and hardships incident thereto. In the operation of such machines, as in all power operated washing machines, considerable vibration takes place. This vibration has a tendency to cause the parts to become loose and materially weaken and shorten the life not only of the tub itself, but the driving or gearing mechanism. Moreover, such machines were unbalanced or top-heavy, that is, the heavy gearing or driving mechanism mounted on the side of the tub had a tendency to upset the machine or tip it over when being moved or handled. Another objection was that the out of balance driving mechanism produced a combined torque and leverage action not only on parts of the driving and gearing mechanism, but on the tub proper. With the machines carrying the comparatively heavy driving mechanism, it necessarily required that the tub be comparatively rigid and heavy and it was impractical to utilize light, thin material, such as aluminum and the like. My present invention overcomes all of these inherent disadvantages and objections of the old machines and is designed and arranged so as to provide commercially, tubs of light, thin material, such as aluminum with the many inherent advantages.

It is a further object of my invention to provide in a motor driven washing machine of this type a unitary, self-supported, counter-balanced, vertically arranged gearing and driving mechanism for the power actuated members of the tub, which mechanism in turn forms a continuation of one of the supports or legs for the tub, entirely relieving the tub of the weight and strains incident to the gearing mechanism, the variable expansion and contraction of the parts under different climatic conditions, and the vibration set up by the motor.

It is a further object to provide in a washing machine of this type a self-supported, counter-balanced, vertically arranged driving mechanism extending above and below the tub in spaced relation thereto and adapted to support the tub and the wringer above the tub, so as to permit the wringer to be swung entirely free of and away from the tub.

It is a further object of my invention to provide a washing machine of this type with a self-contained motor and driving mechanism disposed in a supporting frame in the most advantageous positions to insure effective and economical operation, said frame being constructed in a manner to capably support the weight of the parts and to offset the overbalancing effect of unequal distribution of said weight.

It is a further object of my invention to provide in a machine of this type a unitary, self-contained driving and gearing mechanism mounted in axial alignment on its own support, said mechanism being preferably spaced from and attached to the tub for supporting the same and extending above the tub, so that a wringer or the like mounted on the top thereof can be swung into overlapping relation with at least two side edges of the tub.

It is a further object of my invention to provide in a machine of this type a self-supported, substantially counter-balanced gearing and driving mechanism adapted to drive an element within the tub from below and a second element above the tub and at the same time form one of the supports for the tub.

Another object resides in supporting the tub from a plurality of legs one of which is offset from the tub body and on which the vertical wringer drive shaft, and the wringer which swings axially about such shaft, are directly mounted thereby relieving the tub body of all weight and operating strain of this added mechanism, so that a comparatively light tub may be used.

Still another object resides in providing, in addition to the foregoing, a substantially rectangular frame or bracket rigidly connecting the bottom of the three tub legs and forming a support for the motor or other prime mover, which rectangular frame is formed with an angular extension projecting beyond the plane of the tub wall and rigidly connected to and bracing the tub leg which supports the gear casings and driving connections from the motor to the moving parts.

The above and other features of novelty, ad-

vantages and capabilities will become apparent from a detailed description of the accompanying drawings in which I have illustrated one form of my invention, but the construction there shown is to be understood as illustrative only and not as defining the limits of my invention.

In the drawings

Fig. 1 is a side sectional view of my improved washing machine.

Fig. 2 is a section on line 2—2 of Fig. 1, and Fig. 3 is a section on line 3—3 of Fig. 1.

In general my washing machine comprises a tub of desired shape made of relatively light metal, such as copper or aluminum and having a liquid impeller therein, together with a wringer located above the tub and constructed and arranged to be swung into any desired position across and above the top of the tub and parallel to either of two adjacent sides thereof or if desired to swing entirely clear and away from the tub. In addition there is a prime mover disposed below the tub and power driving connections from the prime mover to the liquid impeller and to the wringer or other actuated devices, and means for supporting the tub, the power driving mechanism, and the wringer so that the weight and vibrations of the former are removed from the tub body and are borne by one of the tub supporting legs, and preferably by disposing one of the legs in direct vertical alignment with the vertical axis of the wringer drive shaft which constitutes the axis about which the swinging wringer pivots and which forms part of the power driving connections.

In the form of my invention shown, the tub 2 has three legs disposed preferably directly under and at three of the corners of the tub. Each leg comprises a rigid metallic section 4 made somewhat tubular in form at its lower portion, to telescopically receive the caster extensions 6 which are slidably clamped therein and form part of the legs for the purpose of adjusting the height of the washing machine. The extensions are held in adjusted position by means of set screws 8.

At the fourth corner, offset or to one side of the tub and preferably spaced therefrom, I arrange a unitary, self-supported, counter-balanced, vertically disposed gearing and driving mechanism for the power actuated members of the tub, which mechanism in turn forms the remaining support or leg for the tub, thereby entirely relieving the tub of the weight and strains incident to the gearing mechanism as hereinbefore pointed out. This unitary structure comprises the stub leg 10 of preferably tubular section in which telescopingly fits the section 12 carrying the caster extension. The upper portion of this stub leg is formed with two laterally extending ears or lugs 14 which provide a support upon which is mounted a gear casing 16 enclosing a part of the driving mechanism which is actuated by a suitable motor or prime mover. Said driving mechanism includes a relatively short driving shaft 18 rotatively mounted in said casing 16, in direct axial alignment with the stub leg. Secured to said shaft is a worm wheel 17 actuated by driven means such as a worm shaft mounted in the casing 16 and rotated in suitable manner by the motor. A vertically disposed driven shaft 20 is spaced from and in direct axial alignment with the first mentioned short shaft 18. There is also provided any suitable type of driving connection from the shaft 18 to the liquid impeller. In the form illustrated such driving connection comprises the divided crank 22 and pitman 24, said pitman having rack teeth 26 thereon meshing with a pinion 28 on the bottom of the liquid impeller shaft 30, upstanding within the tub. The crank 22 provides the driving connection between the shafts 18 and 20, and the pitman 24 provides a driving connection between shaft 20 and the driven shaft 30, so that the driven shafts are independently connected with said driving mechanism. The driven shaft 20 which constitutes the usual vertically disposed wringer drive shaft passes upwardly through the top 34 of the gear casing and is surrounded with a tubular casing 36 which nests at its lower end on a seat 38 formed in the top of the casing. The upper portion of the casing in turn is provided with a bracket or extension 40 which is connected to and forms a support for the tub, so that the tub at this point is supported from the stub leg 10. In addition the upper portion of the tubular casing 36 is held in spaced relation from the wall of the tub by an additional bracket 42. The upper end of the vertical wringer driving shaft is detachably connected to the wringer head 44 which contains reversing gearing for the wringer rolls. This head is formed with a depending sleeve 45 which telescopes over the tubular casing 36 and is detachable therefrom. By means of this arrangement the wringer 46 is swingably mounted to pivot about the vertical drive shaft 20 as an axis while at the same time driven therefrom. As thus mounted, the wringer may be swung parallel to either of two sides of the tub, if the tub be square, or to a position away from and entirely removed from the tub. In using a tub of square dimensions I prefer to space the vertical wringer shaft 20 from the wall of the tub 2 as illustrated clearly in Figure 1 of the drawings so that the drain water from the wringer, in either position of the wringer adjacent either side of the tub, will drain directly into the opening of the tub.

From the foregoing it will be seen that the two vertical shafts, the short shaft 18 carrying the horizontal worm gear, and the upper relatively long wringer drive shaft 20 in vertical alignment therewith, and particularly in vertical alignment with the stub leg 10, and the symmetrically arranged driving connections and castings 16 on each side of this axial line, provide a balanced construction which not only removes the weight of the ponderous parts from the light tub 2 but also receives the direct downward thrust and weight of the wringer 46 and of the rather heavy wringer head 44. In this manner the direct thrust and weight of these parts is carried downwardly to the stub leg 10. Thus all weight, stresses and vibrations incident to operation are entirely removed from the tub body so that it is now possible to construct the tub of relatively light metal and particularly of a metal that will withstand the corrosive and destructive effects of washing liquids.

The stub leg 10 is braced firmly at its lowermost portion by means of a rectangular, substantially diamond-shaped frame 50, which rigidly connects to the other three legs 4 and which frame is provided at one corner with an extension 52 placed in opposed relation to the frame and which extension is connected to the stub leg. In other words this extension 52 is in line with the diagonal passing substantially through the center of the frame 50, which center substantially coincides with the axial line of the liquid impeller shaft 32, and this diagonal line has on its opposite side two tub supporting legs 4, the other two tub sup-

legs being placed directly on this diagonal
one of these latter legs is the stub leg 10.
form shown and described herein I prefer
this diamond-shaped member as a hori-
shelf or bracket provided at three of its
with upstanding semi-tubular connec-
adapted to fit the exterior walls of the
securely fastened thereto by the bolts 8.
maining corner which constitutes the ex-
likewise has an upstanding connection 56
stub leg 10. In this manner the stub leg
ed at its bottom and is positioned in rigid
lation to the tub wall. In the present con-
n the motor 58 is detachably mounted
ard or bracket 60, which in turn is suit-
stened to the bracing member 50. The
is preferably placed on the bracing mem-
otherwise to assist in balancing the lateral
the vertical drive shaft 20, the wringer 48
e gearing 17 and casing 16. It will be
that the line of reciprocation of the
pitman 24 driving the liquid impeller is
adjacent and nearly in line with a line
through one of the legs 6 of the washing
e and the stub leg 10, and that the re-
g two legs 4 are balanced on each side of
gonal thereby providing a most effective
ng arrangement for the washing machine,
rther that the central load of the tub is
axial line of the liquid impeller shaft 30
is symmetrically related to the intersec-
the two diagonal lines joining the three
nd the stub leg 10 and that the motor 58
d in a position to assist in balancing the
load of the unitary, laterally disposed
ed stub leg and vertical wringer drive shaft
its gearing drive and castings. This con-
on provides a most effective balancing ar-
ment for the washing machine so that vi-
al strains and stresses and tendency of
chine to tip over are reduced to the mini-

details of construction and further de-
on of the various features shown in these
gs, for example, the liquid impeller, its
ing in the tub bottom, the tub itself, the
g and gear casings, the drive from the im-
to the vertical wringer drive shaft, the
jector 62 and the wringer mechanism are
t forth and claimed in various copending
ations filed by me and are therefor not de-
d further in detail herein.

ill be evident from the foregoing specifica-
hat I have provided an arrangement by
the driving mechanism 17, the casing 16
e driven shaft 20, which are all located out-
f the vertical plane of the nearest vertical
r corner of the tub are supported by the
haft which is positioned beneath them and
utside of the same plane. In other words,
rovides a most advantageous means for sup-
g the wringer mechanism and heavy parts
ly from their own supporting leg in such
ner that this same leg also firmly supports
b but without detracting from the pleas-
ppearance and symmetrical lines and rug-
ss of the tub support. By means of this
onstruction I am able to eliminate from
b the usual vibrational strains and stress
by the motor, the alternate reciprocations
h liquid impeller and the swinging of the
er into various operative positions. This
ruction permits the use of a light, aluminum
for the tub since ruggedness is not needed
porting the heavy vibrating driving parts.

Likewise by means of the hereindescribed construction, the legs are suitably braced at three points, the lowermost bracing member forming a support for the motor, the intermediate brace not only forming a support for the tub but reactively bracing the leg and gearing casings at this point, and the uppermost brace serving to space the tubular casing from the tub. In addition by means of my improved construction I am enabled to mount the motor so as to substantially counter-balance the lateral weight of the vertical wringer shaft and the wringer; this is accomplished by mounting the motor on the basal support at the side thereof opposite the stub leg. It will be further evident that I have provided a self-contained unit adapted to be attached to the tub, which unit carries in a vertical line, the stub leg, the gearing and gear casings, the vertical wringer drive shaft and the wringer head carrying the swinging wringer and that this self-contained unit when attached to the tub not only relieves the tub of the necessity of supporting the various components of the unit but also forms a support for the tub.

Having thus described my invention,

I claim:—

1. In a washing machine, a tub, supporting means for the tub, said supporting means including a leg member located in a vertical plane offset from the vertical plane of the adjacent portion of said tub, means connecting said offset leg member with said tub, a driving shaft rotatably supported by said leg member, a rotatably supported driven shaft in axial alignment with the driving shaft, but with one end spaced from the adjacent end of the driving shaft, power means constructed and arranged to actuate the driving shaft, an operating member connected to the adjacent ends of said driving and driven shafts, and a second driven shaft extended into the tub and connected with said operating member.

2. In a washing machine, a tub, supporting means for the tub, said supporting means including a stub-leg located in a vertical plane offset from the vertical plane of the adjacent portion of said tub, said stub-leg being provided with a floor-engaging portion, a casing connecting the stub-leg with said tub, a driving shaft rotatably supported in axial alignment with said stub-leg, a driven shaft in axial alignment with the driving shaft, but with one end spaced from the adjacent end of the driving shaft, means within said casing constructed and arranged to actuate the driving shaft, an operating member also located in said casing and connected to the adjacent ends of said shafts, and a second driven shaft extended into the tub and connected with said operating member.

3. In a washing machine, a tub, supporting means for the tub, said means including a leg-member located in a vertical plane offset from the exterior of the tub, said leg member being provided with floor-engaging means, means connecting said leg-member with said tub, a driving shaft supported in axial alignment with said offset leg-member, a driven shaft in axial alignment with the driving shaft but with one end spaced from the adjacent end of the driving shaft, means constructed and arranged to actuate said driving shaft, an operating member connecting the adjacent ends of said shafts, a frame rigidly secured to said supporting means and having an offset extension projected to a position beyond the vertical plane of the exterior of the tub, and engaging said offset leg-member, and a second driven shaft

Page Tightly Bound

extended into said tub and connected with said operating member.

4. In a washing machine, a tub, a driven shaft extended vertically into the tub, supporting means for the tub including a plurality of main legs beneath the tub and a single stub-leg positioned in a vertical plane outside of the tub, all of said legs being provided with floor-engaging means, said stub-leg being located in an imaginary line extended from one of the main legs through a line coinciding with the axis of the driven shaft, the other main legs being equally spaced on opposite sides of said line, a driving shaft supported in axial alignment with said stub-leg and parallel with the axis of the driven shaft, driving mechanism operatively connecting said shafts in such manner that the driven shaft is actuated by the driving shaft, means connecting said stub-leg with the tub, and means connecting said stub-leg with the other legs.

5. In a washing machine, a tub, a vertically disposed driven shaft located within the tub, support means for the tub including a plurality of main legs beneath the tub and a stub-leg positioned outside of the tub in a plane spaced from the wall of the tub and occupying a position in an imaginary line extended from one of the main legs through the axis of the driven shaft, the other main legs being spaced on opposite sides of said line, a driving shaft rotatably supported in axial alignment with said stub-leg, driving mechanism connecting the driving shaft and the driven shaft in such manner that the driven shaft is actuated by the driving shaft and a motor supported by said legs and so positioned with respect to the stub-leg as to counterbalance the weight upon said stub-leg.

6. In a washing machine, a tube, support means for the tube including a plurality of main legs located beneath the tub and a stub-leg located in a plane outside of and spaced from the tub, all of said legs having floor-engaging means, a drive shaft rotatably supported in axial alignment with said stub-leg, a driven shaft extended vertically into the tub and arranged parallel with the axis of the drive shaft, means connecting said drive shaft with said driven shaft in such manner that the driven shaft is actuated by the drive shaft, and a casing connecting said stub-leg and said tub and enclosing said drive shaft, said casing and said stub-leg being so constructed and arranged as to form one of the supports for the tub, said stub-leg occupying a position located in an imaginary line extended from one of the main legs through the axis of the driven shaft, the other main legs being equally spaced on opposite sides of said line.

7. In a washing machine, a tub, support means for the tub including a plurality of main legs located beneath the tub and a stub-leg located in a plane outside of and spaced from the tub, all of said legs having floor-engaging [illegible] casing secured to the exterior of the tub [illegible] also secured to the stub-leg, said casing and [illegible] stub-leg being so constructed and arranged [illegible] to provide one of the supports for the tub, a [illegible] shaft rotatably supported in axial alignment [illegible] said stub-leg, a driven shaft extended [illegible] ly into the tub and arranged parallel [illegible] axis of the drive shaft, means connecting [illegible] drive shaft with said driven shaft in such manner that the driven shaft is actuated by [illegible] drive shaft, said driven shaft and said [illegible] ing means being located within said casing, [illegible] casing being constructed and arranged as to [illegible] close said drive shaft, said stub-leg occupying [illegible] position located in an imaginary line extended [illegible] from one of the main legs through the axis of [illegible] the driven shaft, the other main legs being equally spaced on opposite sides of said line.

8. In a washing machine, a tub, a driven shaft extended vertically into the tub, support means for the tub including a plurality of main legs located beneath the tub and a stub-leg located outside of the tub, all of said legs having floor-engaging means, a frame member located below the tub and having an extension projecting a substantial distance beyond the vertical plane of the tub and engaging said stub leg, said extension being projected along an imaginary line extended from one of the main legs through the axis of the driven shaft, the other main legs being equally spaced on opposite sides of said line, said frame member being also connected with the main legs, a drive shaft rotatably supported in axial alignment with said stub-leg, means connecting said drive shaft with said driven shaft in such manner that the driven shaft is actuated by the drive shaft, and means for actuating said drive shaft.

9. In a washing machine, a tub, a driven shaft extended vertically into the tub, a drive shaft located outside of the tub, driving mechanism outside of the tub operatively connecting said shafts, a driven actuator for the drive shaft [illegible] located outside of the tub, a second driven shaft located in alignment with the drive shaft, a driving connection between the drive shaft and the last mentioned driven shaft in such manner that the driven shaft is actuated by the driving shaft, support means for the tub consisting of a plurality of main legs beneath the tub and a stub-leg in a vertical plane offset from the axis of the tub and axially aligned with the drive shaft and the second driven shaft, and in an imaginary line extended from one of the main legs through the axis of the first mentioned driven shaft, the other main legs being equally spaced on opposite sides of said line, all of said legs being provided with floor-engaging [illegible]

HOWARD F [illegible]